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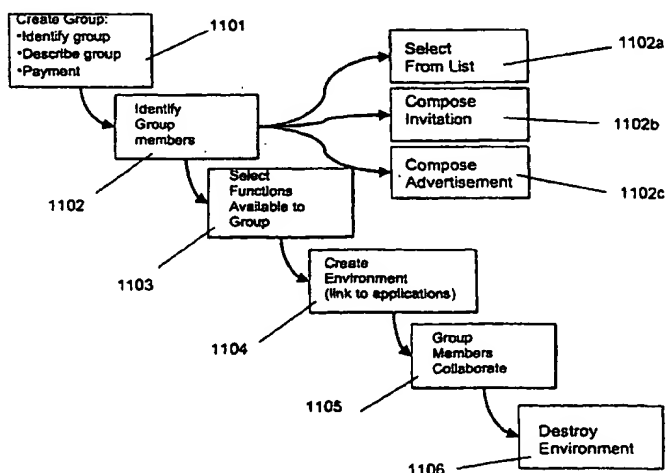
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(54) Title: USER-DEFINED DYNAMIC COLLABORATIVE ENVIRONMENTS



(57) Abstract

A collaborative system and method allows members of a group to collaborate on a project such as a bid or proposal. According to a first embodiment, a complex instrument trading engine (CITE) facilitates negotiation between two or more parties. A set of tools and techniques are provided in order to facilitate negotiation and execution of complex instruments such as contracts between corporations and governments. According to a second embodiment, referred to as a dynamic collaborative environment, a user can define a group and a virtual private network environment including user-selected tools that facilitate communication, research, analysis, and electronic transactions within the group. The environment can be destroyed easily when it is no longer needed. Multiple environments can co-exist on the same physical network of computers.

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1 **USER-DEFINED DYNAMIC COLLABORATIVE ENVIRONMENTS**

2 This application is related in subject matter to and claims priority from
3 provisional U.S. application serial number 60/101,431, filed on September 22, 1998.

4 The contents of that application are bodily incorporated herein.

5 **BACKGROUND OF THE INVENTION**

6 1. Technical Field

7 This invention relates generally to computer systems and networks. More
8 particularly, the invention relates to systems and methods for providing user-defined
9 collaborative environments for transacting business or electronic commerce.

10 2. Related Information

11 Following hurricane Andrew, many insurance companies sought to limit their
12 risk by withdrawing coverage from coastal areas. While this made good sense for the
13 specific companies, it was not acceptable from a societal perspective. The cities,
14 towns, homes and businesses built near the coasts could not afford to go without
15 insurance, nor could the financial institutions that loaned money on these properties
16 afford the risk. The problem facing the insurance companies was not the absolute
17 magnitude of the risk, but the concentration of the risks in one area, leading to the
18 possibility of very large losses resulting from a single event.

19 One law firm had conceived the idea of providing a mechanism for insurance
20 companies to exchange risk. Companies with a high exposure in one area (e.g.
21 Florida windstorms) could reduce their risk by ceding part of this to another company
22 with non-coincident risk (e.g. California earthquakes) and assume part of the second
23 company's risk in return. A company (CATEX) was formed to conduct such trading,
24 but the trading rules had yet to be defined and the trading infrastructure had not yet
25 been developed. CATEX postulated that the key barrier to insurance risk trading was
26 determining the relative risk of different perils in different regions. One approach
27 suggested by CATEX was to try to estimate these relative risks (termed relativities)
28 for a broad set of perils and regions, to provide an initial basis for trading.

29 It was recognized, for various reasons, that this could not be done feasibly
30 because: general estimates of risk, rather than the risk for specific locations,
31 buildings, ships, etc. would be inadequate for commerce; there were many risks to
32 evaluate given all of the permutations of location, perils, and structure; and
33 companies would not be willing to trade risk based strictly on a third-party's analysis

1 An analysis of the problem, however, indicated that estimating the relativities
2 was not essential to facilitate trading, or, in a broader sense, that trading was the only
3 way to address the problem of insuring concentrated risk. The key difficulty was
4 determining how to create greater efficiency in the reinsurance market, whether by
5 introducing new instruments (like swaps), bringing new capital to the market,
6 connecting more buyers to more traders, or reducing the cost of placing reinsurance.
7 It was determined that the above concept could be implemented in an electronic
8 trading system that could play an important role in promoting these factors, and
9 could, in fact, transform the reinsurance market, which is not very automated. A
10 system that allowed trading was developed and implemented. A more detailed
11 description of this system, as enhanced in accordance with various inventive
12 principles herein (referred to as "first-generation" complex instrument trading
13 technology), are provided below. More generally, as electronic commerce (and
14 business-to-business commerce, in particular) has grown, various companies have
15 developed software tools and services to facilitate transactions on the Internet and
16 over private networks. E-Bay, for example, hosts a well-known web site that
17 operates a transaction model (a so-called "concurrent auction") that permits buyers
18 to submit bids on items offered by individuals. Lotus Notes provides a network-
19 oriented system that allows users within a company to collaborate on projects.
20 Oracle Corporation hosts various transaction engines for clients that pay to host such
21 services on a web site. DIGEX Corporation similarly hosts web-based application
22 programs including various transaction engines. Other companies sell so-called
23 "shrink wrap" software that allows individuals to set up web sites that provide
24 catalog ordering facilities and the like.

25 Some Internet service providers, such as America Online, host "chat rooms"
26 that permit members to hold private discussions with other members who enter
27 various rooms associated with predetermined topics. A company known as
28 blueonline.com hosts a web site that facilitates collaboration on construction projects.
29 Various virtual private networks have been created to facilitate communication
30 among computer users across the Internet and other networks, but these networks
31 provided very limited functionality (e.g., e-mail services); are not user-defined (they
32 must be created and installed by system administrators); and they cannot be easily
33 destroyed when they are no longer needed.

1 The aforementioned products and services are generally not well suited to
2 facilitating complex electronic transactions. As one example, most conventional
3 services are predefined (not user-defined) and are centrally administered. Thus, for
4 example, a group of companies desiring to collaborate on a project must fit their
5 collaboration into one of the environment models provided by an existing service
6 provider (or, alternatively, build a custom system at great expense).

7 Suppose, for example, that a group of high school students needs to
8 collaborate on a research paper that requires soliciting volunteers for a survey on drug
9 use, conducting the survey, brainstorming on the survey results, posing follow-up
10 questions to survey participants anonymously, publishing a report summarizing the
11 results, and advertising the report for sale to newspapers and radio stations. This
12 project requires elements of communication among persons inside a defined group
13 (those writing the paper) and outside the group (e.g., survey participants); conducting
14 research (conducting the survey, compiling the results, comparing the results with
15 other surveys published by news sources; and brainstorming on the meaning of the
16 results); and conducting a commercial transaction (e.g., publishing the survey in
17 electronic form and making it available at a price to those who might be interested
18 in the results). No existing software product or service is available to meet the
19 specific needs of this research team. Creating a user-defined environment including
20 tools and communication facilities to perform such a task would be prohibitively
21 expensive. Even if such a tailor-made environment could be created, it would be
22 difficult to disassemble the environment (computers, networks, and software) after
23 the project was completed.

24 In short, there is a need to provide a user-defined collaborative environment
25 that is tailored to the needs of particular groups that conduct communication,
26 research, electronic transactions, and deal-making.

27 **SUMMARY OF THE INVENTION**

28 A first embodiment of the invention, referred to as a complex instrument
29 trading engine (CITE), facilitates negotiation between two or more parties. In this
30 embodiment, a set of negotiation tools and techniques such as anonymous email,
31 secure communication, document retention, and bid and proposal listing services are
32 provided in order to facilitate the negotiation and execution of complex instruments
33 such as contracts between corporations, governments, and individuals.

1 A second embodiment of the invention, referred to as a dynamic collaborative
2 environment (DCE), allows members of a group to define a dynamic virtual private
3 network (DVPN) environment including user-selected tools that facilitate
4 communication, research, analysis, and electronic transactions both within the group
5 and outside the group. The environment can be destroyed easily when it is no longer
6 needed. Multiple environments can co-exist on the same physical network of
7 computers.

8 Although the two embodiments are described separately for ease of
9 comprehension, it should be understood that the two embodiments share many
10 features and, in fact, the second embodiment could include some or all of the features
11 of the first embodiment in a generalized collaborative system. Consequently,
12 references to a specific embodiment in the following description should not be
13 deemed to limit the scope of features or tools included in each embodiment.
14 Moreover, references to specific applications, such as the reinsurance industry,
15 should not be deemed to limit the application of the invention to any particular field.

16 **BRIEF DESCRIPTION OF THE DRAWINGS**

17 FIG. 1A shows a four-step model of deal making including meeting, analysis,
18 negotiation, and closing the deal.

19 FIG. 1B shows contract formation among a group of parties to a contract.

20 FIG. 2 shows a listing display system showing all offers for contracts and
21 responses thereto.

22 FIG. 3 shows details of a listing that has been selected by a user.

23 FIG. 4 shows one possible implementation of a reply card definition screen.

24 FIG. 5 shows one possible implementation of a document management
25 screen.

26 FIG. 6 shows one possible implementation of a screen indicating persons
27 having access to a shared folder.

28 FIG. 7 shows a list of consummated deals in the system.

29 FIG. 8A shows detailed information regarding a completed trade.

30 FIG. 8B shows a deal summary including structured and unstructured
31 information concerning the deal.

32 FIG. 9 shows a "flip widget" in a first state.

33 FIG. 10 shows a "flip widget" in a second state.

1 FIG. 9A shows a more detailed example of a "flip widget" in a first state.

2 FIG. 10A shows a more detailed example of a "flip widget" in a second state.

3 FIG. 11 shows method steps that can be carried out to define, create, and
4 destroy an environment according to a second embodiment of the invention.

5 FIG. 12 shows one possible system architecture in which various principles
6 of the invention can be implemented.

7 FIGS. 13A through 13C show one possible user interface for creating a group
8 and identifying group members.

9 FIG. 14A shows one possible user interface for selecting group members from
10 one or more lists.

11 FIG. 14B shows one possible user interface for selecting group members by
12 composing invitations.

13 FIG. 14C shows one possible user interface for selecting group members by
14 composing an advertisement.

15 FIG. 15 shows a banner advertisement 1501 displayed on a web site, wherein
16 the banner advertisement solicits participation in a group.

17 FIG. 16 shows one possible user interface for selecting communication tools
18 to be made available to group members.

19 FIG. 17 shows one possible user interface for selecting research tools to be
20 made available to group members.

21 FIG. 18 shows one possible user interface for selecting transaction engines
22 to be made available to group members.

23 FIG. 19 shows one possible user interface for selecting participation engines
24 to be made available to group members.

25 FIG. 20A shows an authentication screen for group members to gain access
26 to a newly created environment.

27 FIG. 20B shows a web page generated for a specific user-defined
28 environment, including tools available to group members having access to the
29 environment.

30 FIG. 21 shows one possible method of generating environments in accordance
31 with various aspects of the present invention.

32 FIG. 22 shows one possible data storage arrangement for storing and
33 manipulating brain writing cards.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A. COMPLEX INSTRUMENT TRADING ENGINE EMBODIMENT

A first embodiment of the present invention provides a second-generation version of a complex instrument trading system. The second-generation system includes specialized tools that were not included in the first version of the prior art CATEX insurance trading system described above. These tools represent a substantial improvement over the first generation and incorporate new concepts of communications in a trading environment, and other capabilities that did not exist in the first generation technology. In addition, it is believed that many of these tools are also applicable to software systems other than the Complex Instrument Trading Engine or Negotiating System (CITE) described herein. Thus, the inventive principles are not limited to trading systems for complex instruments, nor even to trading systems in general.

Primarily, the tools described herein ameliorate certain difficulties associated with trading of complex instruments. Complex instruments are instruments where there is more than one dimension for negotiation. As compared to such instruments as securities, complex instrument transactions take longer to research and consummate and require more extensive documentation. For example, stock trading employs a simple instrument (a share) and negotiation focuses on one dimension (price) while insurance contracts have many dimensions (term, price, coverage, definitions of perils, etc.). The stock market is relatively simple to automate -- as soon as bid and asked prices match, the deal is concluded in an instant according to the rules of the exchange. Automation of complex trading is much more difficult, since the parties must negotiate and reach agreement on multiple dimensions and document that agreement using an instrument specific to the precise agreement. Automation of complex instrument trading is more difficult in every way than trading simple instruments.

The trading model behind the Complex Instrument Trading Engine or Negotiating System is built around a simple, four-step model of deal making. Referring to FIG. 1A, the steps are as follows:

1. Meeting: Potential buyers connect with potential sellers with reciprocal interests. This connection does not mean that a deal will necessarily be concluded but simply that the two parties have some basis for continuing discussion. In simple

1 instrument trading, it is typically only necessary to advertise quantity and price
2 offered or sought. Offers for complex instruments must include substantially more
3 detail and (frequently) extensive attachments or exhibits.

4 2. Research/Analysis: Each company considers its own position and/or offer
5 and the counter party's position. Using information and analytic tools from various
6 sources, including internal resources and resources provided by or through the trading
7 system, each party does research and refines its position. The multiple dimensions
8 of complex instruments increases the analytical complexity and limits the value of
9 a simple market price. As indicated by the arrows in FIG. 1, this step is usually
10 performed iteratively with the negotiation.

11 3. Negotiation: Parties to the negotiation speak directly and exchange
12 whatever information is necessary to advance the deal. As indicated by the arrows
13 in FIG. 1A, this step is usually performed iteratively with the research step.

14 4. Close: the companies negotiate and sign an instrument that documents the
15 deal. This can be a complete and detailed contract, or it may be a simple
16 memorandum. In simple instrument trading, the actual trade agreement is often
17 standardized by the exchange. In complex instrument trading, the agreement must
18 be more specific to the deal, though it is possible to use such tools and fill-in-the
19 blank forms.

20 Within a system using these complex instrument tools, trading parties can
21 place offers to buy, sell, or trade in a public area, and examine such offers ("listings")
22 posted by others. Using advanced communications tools the parties can conduct
23 initial discussions to determine if a placement is possible. Using tools described
24 herein, the initial contact can be done anonymously.

25 If a deal seems possible, the system preferably provides access to the
26 extensive information necessary to assess the possible deal. This can include static
27 information (e.g. reports or data) maintained within the system, links to information
28 providers outside the system, online analytical tools, and links to providers of
29 analytical services.

30 For complex instruments, the process of negotiating a deal is contemplated
31 to be an iterative one, with successive stages of analysis and discussion. The need
32 for extensive communication is one of the critical distinctions between trading of
33 simple instruments (e.g. retail sale) and complex instruments. Complex instrument

1 trading requires dialog and more -- exchange of documents (often voluminous),
2 consultation with counsel and intermediaries, conferencing, and working together on
3 the final agreement. For electronic commerce to have an impact in complex
4 instrument trading, it must support and facilitate this communication, and not force
5 traders to fall back on methods and technology outside the electronic trading
6 environment.

7 The final step is closing the deal. The companies can negotiate a contract
8 online. Tools provide sample, fill-in the blank contracts and memoranda of
9 understanding as a starting point. Negotiators can begin with these, or they can use
10 one of their own. Collaborative software makes it possible to display text
11 simultaneously on each negotiator's screen and to work on the language together.
12 When the contract is final, the system allows for secure, online signature, though
13 companies not comfortable with electronic signature for very large deals may print
14 a hard copy and sign it conventionally.

15 By creating electronic exchanges for complex instrument trading, the CITE
16 tools can have a fundamental and positive impact on many areas of commerce:

17 1. An electronic exchange makes it possible to put an offer in front of more
18 people more quickly than could be informed through direct contact, even allowing
19 for active intermediaries or brokers.

20 2. Traders can advertise and conclude deals without the need for an
21 intermediary when they have adequate support or internal resources.

22 3. Through better communications, wider exposure for offers, and the first
23 steps towards standard contract language, electronic trading of complex instruments
24 can substantially reduces transaction costs.

25 4. With lower transaction costs, it is possible to conclude deals that were not
26 possible with higher overhead.

27 5. Through the immediate posting of the results of trades, pricing is moved
28 towards a market basis, reducing research and analysis costs enormously. This
29 speeds placement.

30 6. Smaller exposure means lower risk, and market pricing is an adequate
31 surrogate for analytically derived pricing in some circumstances. Together these
32 factors make it possible for traders to participate in markets or market segments in
33 which they would not normally do business.

1 7. By making it possible for all companies, large and small, to talk directly
2 to each other, electronic trading of complex instruments can lead to the
3 democratization of the marketplace increasing competition.

4 Overall, electronic trading of complex instruments has the potential to
5 improve the efficiency of markets enormously, and to establish markets in areas of
6 commerce that are currently done through intermediaries or on a one-on-one basis.

7 The trading tools described herein are designed to facilitate electronic trading of
8 complex instruments. The first-generation complex instrument trading tools broke
9 new ground in the extension of electronic commerce into new and more complicated
10 markets. The table below summarizes the areas of new and improved technology,
11 organized into the four steps of the general complex instrument trading model.

Phase	First Generation Complex Instrument Trading Technology (PRIOR ART)	Advanced Complex Instrument Trading Technology
Meet	<ul style="list-style-type: none"> • Operates on private network only • Post a listing to board by filling out a form • Display listing summary in a table • Search listings by key word • Post response to listing on board • Establish communications with lister by following up on contact information in listings using unconnected communications tools 	<ul style="list-style-type: none"> • Operates on private network or over the Internet • Post listing to a board by filling out a form • Listings and responses can have attachments and documents • Display listing summary in a table, with sorting by title, date, market type, buy/sell, or listing number. • Search listings by keyword • Register keywords with an electronic "agent" that monitors listings and sends notice of relevant new listings by Email • Post response to listing on board • Send private response (anonymously or with name attached). • Response can be through a "reply card" designed by the trader posting a listing, to structure responses • Direct connection between listings and communications tool

Analysis	<ul style="list-style-type: none"> • Internet access to research resources, on line and third-party analysis 	<ul style="list-style-type: none"> • Internet access to research resources, on line and third-party analysis • Research resources searchable using the same search engine and display as used for listings. • Online dialogs / user groups
Negotiation	<ul style="list-style-type: none"> • Requires private network • Directory of contact information for all traders • Connection between directory and Email client. • Directory not linked to other components of the system • Anonymous mail application providing for communications between two individuals • Anonymous mail delivered to mail client • No attachments for anonymous mail • No system for central repository of documents 	<ul style="list-style-type: none"> • Works on Internet or private network • Directory of contact information for all traders. • Direct connection between directory and Email client • Direct connection between directory and online conferencing software • Directory linked to listings and document management tool • Anonymous mail application providing for communications between individuals or groups of people working together • Anonymous mail does not require separate Email client software • Anonymous mail supports attachments • Internet-based system for distributions and sharing of documents. • Password and secure has protection for documents.
Closure	<ul style="list-style-type: none"> • Requires private network • Online signature of uploaded document 	<ul style="list-style-type: none"> • Internet or private network • Online signature of uploaded document • Registration / closure of deal through a fill-in form • Provision for digital signature and archiving of all documents associated with a deal

1

2

Referring to FIG. 1B, one aspect of the system within the framework of the

1 negotiation/analysis loop shown in FIG. 1, is the ability to define one or more
2 contracts, for example, in the parlance of the reinsurance trade, "slip sheets." Various
3 members of a group of authorities modify the contract causing it gradually to take a
4 final form that is either rejected as untenable or accepted as a finalized deal. The
5 system exposes various aspects of the contract and attendant documents to the
6 appropriate participants in the transaction, also providing each with a level of
7 authority to add, delete, or modify documents as well as the evolving contract or
8 contracts (assuming there may be various contract templates being discussed). These
9 filters (filter 1 through filter 4, for example), as shown in FIG. 1B, determine the
10 authority of the party (Party 1-Party 4) to modify or see the data object, whether it is
11 a document or a slip sheet. The system combines this system of filters with signature
12 technology for closing the deal; that is, implementing signatures so that an
13 enforceable contract is generated.

14 A deal is like any other data object and once it is defined and entered, it
15 cannot be modified. Elements of the deal can be "signed" such as documents
16 attached to a contract (for example, Contract 1 has documents D1 and D2 attached
17 to (combined with) it. Together these elements, the contract and the attachments,
18 define the deal. Also, the entire deal 245 can be signed using a signature device
19 ("widget") S8. Other documents may relate to a deal but not be attached. These can
20 be viewed using a document manager described further below.

21 Listing System

22 Referring to FIG. 2, a listing screen displays all offers for contracts, for
23 example offer 314, as well as responses to them, for example, response 313. The
24 parameters of the offers and responses to them are shown in columns, the heading of
25 each of which may be selected to sort the listings by that heading, for example
26 heading 315 if clicked would sort by the unique index number for the listing. Notice
27 that the responses (for example, response 313) are shown indented to indicate a series
28 of elements of a dialogue-thread. As indicated, the responses have a "daughter"
29 relationship to the parent listings. That is, listing 314 is a parent and reply 313 is a
30 daughter. The daughters remain in their hierarchical position beneath the parent
31 despite sorting by the column headings. This makes the tabular sort scheme
32 compatible with a threaded display, which is useful to show dialogues.

33 Referring now also to FIG. 3, when a user invokes a display of the details of

1 a listing by clicking on an index hyperlink 312 to show the details of the listing, a
2 user interface element displays the lister's defined parameters of the listing. As
3 shown, various parameters are displayed, many of which are hyperlinked. For
4 example, attachments 304 may be selected to display the corresponding attachments.
5 A detailed description 301 may be provided as well as specific instructions for
6 responding 302. A reply button 303 permits the user to reply. Activating the reply
7 button 303 will either invoke a standard public reply screen which creates a new
8 listing similar to the parent listing or a special reply defined by a reply card which is
9 further described below.

10 A reply to a listing can take the form of a public reply that invokes a screen
11 substantially the same as FIG. 3 but with blank spots for entry of reply information.

12 A more useful kind of response element is a reply card that can be defined by the
13 lister. This is because in negotiations on complex transactions such as reinsurance
14 contracts and, for example, pollution emission allowances, the parties with whom a
15 lister would be willing to trade are limited in terms of certain criteria. These criteria
16 will vary from one type of transaction to another.

17 In an active trading system, the number of listings can quickly grow to a large
18 number and quickly exceed the number which can conveniently be displayed in a
19 single table. Several capabilities are built into the system to address this problem.

20 First, by default, listings are presented in order from newest to oldest. Second, the
21 sort capabilities previously described allow users to modify the standard order.
22 Third, the total market may be divided into subcategories. In the area of insurance
23 catastrophe risk, these could include categories for different lines of insurance (e.g.
24 marine, aviation, commercial buildings). Fourth, users may enter search criteria to
25 identify a subset of listings of particular interest.

26 Searching listings: A user may enter a keyword such as "hurricane" to
27 identify all listings that contain that word in the title, description, and (optionally)
28 attachments. To improve the reliability of the search, users are provided access to
29 a standard lexicon when composing a listing. In the first embodiment, this capability
30 is invoked by pressing the right mouse button while the cursor is any field of the
31 listing. A list of common terms is displayed. The user can select the term of
32 interest, which is then placed into the text of the listing at the insertion point marked
33 by the cursor. For example, a listing for insurance risk would typically include a

1 field for geographic scope (i.e. the location of the properties to be insured). When
2 in this field, the lexicon displayed would include terms such as "California" and
3 "Coastal Florida". Choosing a term from the lexicon insures uniformity of
4 terminology across listings and between the search engine and the listings.
5 "California" will be used rather than a mix of "Ca", "CA", "Calif", etc. The search
6 is further improved by symantic indexing. Essentially, this means that synonymous
7 terms are grouped, so that searches for one will find the other. A person who
8 searches for "California" will get listings for "Los Angeles" that do not include the
9 word "California".

10 The search engine can include an agent capability. This agent capability
11 offers the user the option of saving a search, after the user reviews the results and
12 deems them acceptable. This search is retained in a library of searches along with the
13 email address of the owner of the agent. The search is retained in the library until
14 is it either deleted by the user when it is no longer needed or automatically deleted
15 in a cleanup of searches older than a certain date. Whenever a new listing is placed
16 on the system, all of the saved searches are executed. If the new listing meets any
17 of the search criteria, a message is sent to the owner of that criterion via email or
18 instant messaging.

19 A model was developed to allow a lister to define a set of criteria and request
20 a set of information from any respondents in the form of an anonymous reply "card."
21 The card defines a set of requested information which may be packaged as a
22 document object and placed in the document manager system and connected with
23 each listing. A user would download the reply card and fill the card out and send it
24 back to the posting party.

25 A document object, called a reply card, is made available to a respondent
26 through the document manager. The respondent is permitted to retain his anonymity
27 as is the lister. Each may communicate with the other through an Amail system
28 described in more detail below. The respondent supplies the requested information
29 and sends the data to the lister. A system in the listing manager allows a lister to
30 define a reply card having any particular fields and instructions required of a
31 respondent. Some of the information required may be obtained automatically from
32 a set of default data stored on the respondent's computer.

33 Referring to FIG. 4, a reply card definition screen is invoked to define the

1 parameters of a new listing. The new listing is defined using a user-interface element
2 looking much like FIG. 3. While the details are not critical, the definition of reply
3 card involves, in essence, the definition of a user-interface control such as a dialog
4 with radio buttons, text boxes, etc. These are definable for server-side
5 implementation through HTML and are well known so the details are not discussed
6 here. The lister defines a set of controls that allow the entry by a replying party of
7 the information that the lister requires. The reply card is stored as any other
8 information object and may be organized and accessed through the document
9 manager described below. FIG. 4 shows a simple example of a format of a reply
10 card.

11 A reply card is created by a user when posting a new listing. The lister
12 specifies the information that must be included in a response, and the type of
13 information object to display for the data element (e.g. a text box, check box, radio
14 button). The system then creates an HTML page to collect the requested information.
15 When a respondent clicks "Reply Card" on the listing screen, the page is displayed.
16 All of the responses are automatically entered into a database created automatically
17 when the reply card is composed. As each respondent fills out a reply card, a new
18 record is added to the database of the system and the lister is permitted to view it
19 through an appropriate filter as discussed above.

20 Signature System

21 As business is increasingly done in an electronic environment, electronic
22 signature and approval is becoming more critical. The typical electronic signature
23 model has focused on two aspects:

- 24 1. Electronic validation of the user -- specifically determining that the person
25 viewing a document on line is the authorized signatory; and
- 26 2. Validating the document being signed by a means that either prevents
27 modification of a document or will reveal whether changes have been made.

28 Methods for validation of identity range from simple personal identification
29 numbers or passwords, to electronic signature pads, and more advanced methods of
30 biogenic validation such as fingerprint or retinal patterns. Methods for document
31 validation range from simple archiving of one or more copies in a read-only model
32 or inaccessible location to methods based on mathematical algorithms that create a
33 characteristic number or alphanumeric string for a document. These strings are

1 termed "electronic signatures." Changes to the document change the electronic
2 signatures. Because the signatures are much shorter than the documents, very many
3 documents have precisely the same signature, but the algorithms to calculate the
4 signature are very difficult to invert, so that it is effectively impossible to deduce a
5 meaningful change to a document that will preserve a specific signature.

6 These two aspects of electronic signature are highly developed, but there has
7 been little analysis or development of the general process by which documents can
8 be signed.

9 The invention allows for secure and reliable routing of documents, for which
10 signatures are required, to a specified list of signatories. Unlike prior art systems,
11 such as ordering or accounts payable systems which have highly structured signature
12 procedures tailored to a specific process, the present invention provides a flexible
13 method and system that allows a signature-type of authority/requirement to be
14 attached any kind of information object. The method is sufficiently abstract, flexible,
15 and general that it can be applied in many contexts aside from the CITE embodiment
16 described in the present specification.

17 One signature method/device employs the following steps:

18 1. Registration of signatories – This process provides a register of identifiers
19 indicating entities with signatory authority and correlates these identifiers with the
20 information objects for which the signatory authority is applicable. The same register
21 may also be used to identify other types of authority in the system in which the
22 signature device is implemented. For example, document read authority,
23 modification authority, exclusive access to documents, etc. may also be provided in
24 the same register. Signature registration may be provided automatically in certain
25 systems where registration of, for example, read/write authority is provided since any
26 entity with signatory authority would in almost all instances, also be provided with
27 some other kind of authority, most notably, read authority. Thus, where the signatory
28 system is embedded in certain kinds of systems, it may be that no particular
29 additional method or device is required to implement signatory registration since an
30 existing register may already exist or be required for other purposes.

31 Registration information includes the general categories of information listed
32 below. Definitions of specific fields within these categories are a function of the
33 specific implementation of the signature system or the parent system. The following

1 are exemplary:

- 2 1. Identity – unique identifier of the entity, the organization(s) with which the
3 entity is affiliated, other relevant information.
- 4 2. Contact information – information indicating how the entity can be
5 reached, how documents and mail messages can be routed to the entity.
- 6 3. Security Information – a password for each class of signature as described
7 further below.

8 2. Classes of signatures – The device/method provides a variety of classes of
9 signature, each associated with a unique level of approval or level of commitment.
10 For example, a class of signature-authority can be defined that represents
11 individuals, for example, with authority to sign contracts only below a set amount,
12 or for expenses relating only to one department of an organization, or within certain
13 time constraints, etc. The signatory system maintains this taxonomy of possible
14 signature types in a database with a unique identifier for each level of authority
15 defined. The system allows the creation and deletion of classes. Each class is
16 preferably permitted to be named and a descriptive definition attached to each class.

17 3. Defining a Set of Signatures – Using an appropriate user interface element, the
18 user of the system selects an information object (for example, a document, file, or
19 collection of such objects) requiring signature(s). The entity originating the signature
20 process then identifies the entity or entities required to sign the object. The
21 specification of the signers can proceed either by the selection of individuals from a
22 list supported by the above defined entity register. Alternatively, in an environment
23 where individuals are strongly bound to organizations, for example, it can proceed
24 by selecting the list of organizations that will sign and, within each organization, the
25 person who will sign. The list is built by a series of selections. After each selection
26 from the list, the user indicates his/her desire to add the selected individual to a list
27 of required signatories. The user interfaces provides for entries in which all the
28 selected signatories are required or only one of the selected signatories are required.

29 For example, if more than one entity is selected from the list prior to the
30 selection (e.g., clicking an "Add" button), the system may require a signature from
31 any of the people selected, but not all of them. To require signature from every
32 member of the group, the initiator may select one person, then "add", select the
33 second, then "add", and so on. Thus, adding a group with one "add" command would

1 provide an "any signature will suffice" list and adding members individually would
2 require a signature from that individual or entity. Note that this technique may also
3 be used to define combinations of required and "any of" groups.

4 For each signer or group of signers selected in a single "add" command, the
5 initiator of the signing sequence must specify the class of signature associated with
6 the person for the document being signed. This may be selected from a list of
7 signature classes (see item 2). If the specific implementation of the signature process
8 only supports one class of signature, the selection of class may be omitted.

9 4. Random or Serial Order of Signature – After or concurrent with the creation of a
10 signature list, the initiator specifies whether signatures must be in order or if a
11 specific order is not required. For purposes of defining the order of signature,
12 individuals who are selected as a group are considered as occupying a single place
13 in the sequence.

14 5. Document Authentication – Upon initiating a signature sequence, the information
15 object is authenticated by means of a secure hash algorithm. The specific hashing
16 algorithm is a matter of design choice or may be made dependent on a user's choice.

17 There are several possible hash algorithms available in the public domain. The
18 electronic signature produced by the secure hash algorithm is archived with the
19 information object in a secure repository. If the information object is, for example,
20 a record in a database, the contents of the record are copied to a file in delimited
21 format for archival purposes. If the object is a table, the table is exported prior to
22 archive.

23 6. Document Routing – Upon initiation of a signature sequence, the initiator
24 specifies how the signatories are to be informed. The options are:

- 25 • No notification from the signature system
- 26 • Email message
- 27 • Email message with attachment of the information object.
- 28 • Posting on a signature web site

29 The system accepts and implements the chosen method, which may be connected to
30 the signature or a single choice applied to all signatories. Alternatively, the method
31 of notification may be stored with the signature class definitions. In a signature
32 process with no required order, e-mail notice may be sent simultaneously to all of the

1 designated individuals at the time of initiation. If the process is serial, only the first
2 person may be notified. The electronic signature of the information object may be
3 included in an e-mail message.

4 7. Accessing the signature system – The signature system can be implemented for
5 access via a web browser or database client-server software across the Internet, an
6 intranet, a LAN, or a WAN. Access to the system will typically require a password,
7 but this may not be necessary on a secure network. Upon access to the system a user
8 will have the option to display a list of all of the information objects which he or she
9 has signed or is being asked to sign. For each object, the display can include the
10 following information:

- 11 • Object name
- 12 • Description of object (text, mime, size, date)
- 13 • List of scheduled signatories
- 14 • Date each person signed
- 15 • Class of signature for each person
- 16 • Electronic signature produced by the secure hash algorithm

17 If the object is available (viewable) on line, the display may also include a link to
18 display or download the object.

19 8. Validation of the Object at Time of Signature – If the user downloads or views the
20 object, the system will execute the secure hash algorithm to calculate the electronic
21 signature. This will be displayed so that the potential signer can compare it to the
22 signature calculated at the time the process was initiated. If the user has previously
23 downloaded the object or received it as an attachment to an Email, the user may
24 access the secure hash code through the signature system and apply it to the version
25 on the user's disk.

26 9. Signing a Document – After the user has determined that an information object
27 is authentic and that the contents merit signature, he or she can affix a signature by
28 authenticating his or her identity. Various means of authentication may be used. The
29 means of authentication may be at the discretion of the manager of the signature
30 system. Such means may include personal identification numbers, passwords,
31 authentication based on computer address or information stored on the signer's
32 computer, third party validation using a public key or other security infrastructure,

1 or biogenic (fingerprint-recognition, retina scan) methods.

2 After a document is signed, the date of signature is recorded in a database so
3 that the display to other potential signers is updated. If the signature process is serial,
4 the next person in the sequence is notified. E-mail notice can be sent to all signers
5 when the last signature is collected.

6 10. Follow-up – At the time a signature process is initiated, the initiator can select
7 a time (in hours, days, or a time or date-certain) for automated follow-up. If a
8 document is not signed within the specified period after notice, a follow-up e-mail
9 can be sent as a reminder. Additional reminders may be sent at the same interval if
10 the object has not been signed. The reminders can be sent automatically by the
11 system according to user-input specifications.

12 11. Cancellation – The initiator of a signature sequence can modify the sequence at
13 any time, except that a signer can not be deleted from the list once they have signed
14 an object.

15 12. Transfer of authority – The individual initiating a sequence can transfer the right
16 to modify the list signature list to another individual in the system with appropriate
17 validation of identity.

18 Document Manager

19 Successfully conducting commerce over an electronic network requires the
20 exchange not only of messages, but of substantial blocks of information in the form
21 of documents and data. Beyond simply transferring files from hand to hand, it is
22 often necessary for multiple parties to work on a document simultaneously or
23 serially, to track changes, and to maintain a record of versions. Two general
24 architectures have emerged for document management, which can be termed a "mail
25 model" and a "repository model." Under the mail model, documents are attached to
26 messages and circulated person to person. Under the repository model, documents
27 are placed in a central location. There are advantages and disadvantages to each. At
28 a summary level:

	Mail Model	Repository Model
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Advantages	Precise routing on a document specific basis. Push in the recipient is informed of a new document. Coupling between document flow and a messaging. Dating is automatic.	Compact storage -- only one version of a file need to be stored. Natural group of files on the basis of subject or access group. Supports good configuration management and version control.
Disadvantages	Creates multiple versions of a document, confounding configuration management and version control. Does not easily couple to online collaboration. Many mail servers limit size of attachment. Relatively high effort to prepare messages.	Not push in the sense that users are automatically informed of new documents. Security model is more complicated than for email. Prior arrangement is necessary to access a repository.

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A browser-based document management model and tool combines the best features of repository model and the mail model, for document dissemination and sharing across the Internet or an intranet.

General Architecture – The general architecture of the system combines two basic components: (1) a database of directories and documents and (2) a directory of users.

The directory of documents lists documents (of any type) contained in the system, and folders that can contain documents or other folders. The directory of users contains a list of individuals and organizations that can access the system, with passwords and/or other information necessary to validate identity and to establish authority.

Representation of document – The term “document” is used here in the broadest sense of any file that can be stored magnetically or electronically. Preferably, each file is given a unique name consisting of a string of no more than 256 characters. Preferably, the character set is limited to those members of the ASCII character set

1 which are displayable or printable. Thus, such codes as "escape" which have no
2 visible representation, would be excluded. This is the file name that is displayed for
3 purposes of identifying the document to the users. There is also an actual file name
4 (which is not shown to users) to identify where copies of the file are stored in the
5 central repository. Certain other information is kept in addition to the name of the
6 file. This includes the following:

- 7 1. Data of creation
- 8 2. Date entered into repository
- 9 3. Person who entered the document into the repository
- 10 4. Description
- 11 5. Size of the document
- 12 6. Document type if known
- 13 7. Date of last update
- 14 8. Access password (optional) stored in encrypted form
- 15 9. File folder(s) where the document appears
- 16 10. Actual file name

17 In addition to the above information, data indicating whether the file is
18 checked-out and to what entity, and the identities of entities that have checked the
19 document out and returned it in the past are also stored. The term "checking out" is
20 described further below. These functions related to file change control and
21 configuration management, which are discussed later.

22 User database – A database contains information on all individuals who can currently
23 access the system or who previously had access up to an administratively determined
24 retention period. This database includes standard contact information including
25 physical and electronic addresses. Security data such as passwords and/or encryption
26 keys is also maintained. In a combined system such as the presently described
27 system, the same database or registry of users can be employed for the document
28 manager as for the signature system.

29 High level directories – The entire document management system can be divided into
30 a number of high level directories that the user can display, one at a time. These
31 include, at a minimum, a "Private" directory of files and folders visible only to the
32 user, and a "Public" directory of files and folders visible to all users. Additional
33 high-level directories can be created by the system administrator as needed. These

could correspond to projects, business units, or any other logical basis. At any point in the use of the document management system, a user can see and select from the high level directories to which the user has access. The name of the currently open directory can be always displayed on the screen.

Displaying the contents of a high-level directory – When a user selects a high-level directory, the repository displays a series of file folders against the left margin of the active window. File folders whose contents are displayed are shown as open folders. File folders whose contents are not displayed are shown as closed folders. A folder is opened or closed by clicking a single time. When a folder is opened, the contents are shown with an indent to indicate the parent/child relationship between the folder and its contents. Each folder can contain files, shown by an icon representing a printed page and other folders, represented by an image of a closed folder.

Information about a folder – Information about each folder is displayed on the same line, to the right of the folder icon. This information is as follows, from left to right:

1. Name of the folder
2. Number of files in the folder, or the word "empty"
3. Accessibility of the folder

Accessibility refers to user access rights to a folder which may be private relative to the entity that created it, restricted (limited to a subset of people who can access the high level directory), or shared (available to everyone with access to the high-level directory). The level of access to a directory is indicated by the words "private", "restricted" or "shared."

If the directory is restricted, clicking on the word restricted displays a list of the entities that have access to the folder. This list is a series of hyperlinks. Clicking on the name of a person pulls up detailed contact information (discussed below). The objective is to facilitate communications between people with a shared interest in a file.

Information about a file – Information about a file is displayed to the right of the file icon. From left to right, the first item displayed is the name. This is followed by the word "details." Clicking on "details," causes the document management system to display complete information about the file (see Item 2, above), the person who placed the document in the file, (see Item 3, above), and the person who most recently modified the file.

1 Information about people/entities, and the link to communications – Information
2 about people/entities with access to the system is displayable at several points in the
3 document manager system:

- 4 1. by accessing the directory of users
- 5 2. when creating a new folder with "restricted" access
- 6 3. when displaying detailed information about a file (see #7)
- 7 4. when displaying information about a restricted directory (see #6)

8 Whenever such information is displayed, contact information from the database is
9 rendered along with the name. Depending on the implementation, this can include
10 complete contact info (multiple addresses, telephone and fax numbers, and email
11 addresses), or some of the contact information may be restricted, in which case it is
12 not displayed.

13 Creating a new top level folder – A new folder is created within a high-level
14 directory, for example by clicking a button labeled "new folder." This can bring up
15 a dialog in which the user assigns a name to the new folder and selects the type of
16 access (private, shared, or restricted) rights to be assigned. If the document is
17 restricted, the user specifies the entities (organizations and/or people) that can access
18 the folder. If the creator of the folder specifies that an organization has access to a
19 folder, all individuals associated with that organization may be granted access.
20 Folders to which a user does not have access may remain hidden or not displayed.
21 Alternatively, these folders can be shown with some indication that they are not
22 accessible, for example, by ghosting.

23 Functions related to a folder – Once a folder is defined, a user can execute the
24 following options.

- 25 1. Create a subfolder, using the same process described in 9
- 26 2. Add a document to the folder, using the process described in 11
- 27 3. Delete the folder, if it is empty
- 28 4. Modify access to the folder using the same tools used to specify access
29 initially

30 The functions can be invoked by, for example, clicking on the appropriate label to the
31 right of the name of the folder icon.

32 Adding a file – Users add a document using a dialog box that prompts for the
33 following information:

- 1 1. Location of file - may be entered by user, or selected through a standard
- 2 file browse dialog
- 3 2. Name to be used for the file in the repository
- 4 3. Version number or name (optional)
- 5 4. Password or encryption key (optional)
- 6 5. Description (optional)
- 7 6. Access rules (read only or read-write)

8 After entering the above information, the user either aborts or initiates upload.
9 The information listed above is recorded along with the name of the person entering
10 the document, and date and time.

11 File options – The following functions may be provided, preferably for every file in
12 the system:

- 13 1. Delete (with confirmation)
- 14 2. Archive. The file is removed from main repository, but a copy is retained
- 15 outside the repository. It may be restored through manual intervention.
- 16 3. View or download: a copy of the file is brought to the user's computer.
- 17 This file can be modified there for the individual user's use. A modified
- 18 version can be uploaded as a new file or different version of a current one, but
- 19 a file in the repository can only be replaced if the user has it checked out.
- 20 4. Check out / check in (see below)
- 21 5. Forward (see below)
- 22 6. Change Password. The old password must be entered followed by a new
- 23 password and confirmation.
- 24 7. Move: copy or move a document from one folder to another.

25 The functions may be invoked, for example by clicking on a label
26 corresponding to the function, which can be displayed to the right of the name of the
27 file. Not all options are shown to all users. If an entity does not have write-access
28 to a file, the entity may not delete it, archive it, check it in or out, or change the
29 password.

30 Check in / Check Out – All entities with write access to a file may check it out. By
31 checking the file out, the entity reserves the exclusive write to save changes to a file.
32 A person may not replace a file that is checked out. To check out a file, the user
33 selects this option from the list of functions associated with the file. The user can

1 then enter an expected return date and a reason that the file is checked out or the
2 changes to be made. This information is available to all others who can view the file.
3 Each check in or check out is recorded in a permanent log. After a file is checked
4 out, the "check out" button or link is changed to read "check in."

5 Each individual can check in only the files that he or she has checked out.
6 This is done by clicking "check in." The user may then upload a new version of the
7 file by specifying the location of the file on disk, or indicate that the version of the
8 file currently in the repository is to be retained. After a file is checked in, the check
9 button is changed back to "check out" and the file can be checked out by another
10 user.

11 Forwarding – A file can be forwarded to any other user of the system. When the
12 forward function is invoked, a list of users is displayed. The sender selects one or
13 more users. Upon confirmation, a copy of the document is placed in folder labeled
14 "in box" in each recipients private directory.

15 Referring to FIG. 5, a main screen for the document manager creates (using
16 server-side scripting) a user-interface display with some of the features of a Windows
17 Explorer® -type display. File and folder icons are shown along with an array
18 features arranged next to each. The similarities with Windows Explorer® fairly well
19 end there, however. Each of the properties shown next to each file/folder entry
20 invokes a feature.

21 A parameter object W "Details" invokes a detailed display of the
22 corresponding document object. The details can include contact information about
23 the creator of poster of the document or other data as desired. This data can be
24 hyperlinked and a return button can be provided to return the display back to the
25 screen shown in FIG. 5. Clicking the "details" button to the right of any document
26 brings up the display which can include the name, contact information, and other
27 details about the person who loaded the document into the system, similar
28 information about a person who has the document checked out, and, optionally, a
29 description of the document and information on its change history.

30 A parameter object X "Forward" simply sends the document to a selected
31 user. A selection screen can be invoked to allow selection of the recipient of the
32 document from the user registry. Of course, since most correspondence can be
33 handled on the server side, the user is, in reality, simply notified of the transfer and

1 the recipient's action to view the document simply invokes a server side feature to
2 display the document. The document is not actually transferred bodily to the
3 recipient since the recipient, as a registrant logged in the user registry, can access it
4 through the server by requesting to do so.

5 A parameter object U "Check-in" checks in a document that has been checked
6 out. Other users may view the document, but not modify it when it is checked out.

7 This button is not accessible to users that have not checked the document out and
8 may be displayed ghosted or not displayed at all. A similar button can be displayed
9 if a document that is not checked out may be checked out by the user authorized to
10 see the document manager displayed shown in FIG. 5.

11 A parameter object T "Download" actually transfers a copy of the document
12 to the client computer. Another object S "Delete" allows the document to be deleted.
13 A new document can be added by clicking "New Document" Q. These are fairly
14 conventional notions, except for their placement on the screen and the fact that each
15 is filtered depending on the user's rights.

16 Note that when a folder is created, access to the folder can be restricted to the
17 creator, shared with everyone (in which case the folder is created in the public
18 directory), or shared with a select group of other users. The other users can be
19 selected by company or organization (providing access to all individuals in the
20 organization) or by individual within an organization. These are all selectable
21 through a linked selection control where if one selects a company in one selection
22 control, it shows employees in the linked selection control.

23 A parameter object P "Shared" displays a hyperlinked page that shows all
24 users with access rights to the document. This page allows a user that places a
25 document in the document manager or a user that has pertinent modify rights, to alter
26 the parties that have access to the document. Also, it allows a user with read-only
27 rights to see the list of users that can access that document. The names of the sharing
28 parties are hyperlinked to invoke the user's email client to allow fast sending of email
29 (which again may be performed server-side without actual transfer) or conventionally
30 or selectively. If a folder is shared, the word "Shared" appears to the right of the
31 folder. Clicking on "Shared" brings up the list of person who can access the folder,
32 as shown in FIG. 6. Each name is a hyperlink to detailed contact information.

33 FIG. 7 shows a list of all deals that were completed through the system. The

1 trade number (left column of the grid) is a hyper link to detailed information.

2 FIG. 8A shows detailed information about a completed trade. It shows the
3 party to the trade, the price or rate, and a description of what was traded. The
4 particular nomenclature is specific to a market. For insurance, for example, price is
5 termed rate, and the summary of a deal is the slip sheet. A complete contract can be
6 attached. Included documents can be downloaded to view on line. The intended
7 signatories to a deal are shown (there can be more than two).

8 If a signatory has actually signed the document electronically, the date and
9 time are shown. No date and time are shown for parties that have not yet signed.

10 The amount of information displayed on the screen is dependent on the identity of
11 the person viewing the screen. The viewer can be blocked from viewing any
12 information about a deal, or certain fields, such as the contract details or the name of
13 signatories.

14 Note that the detail screen of FIG. 8A would also show attached exhibits. The
15 FIG. 8A display is the basic device for signing deals. A similar device would be used
16 for signing documents.

17 Referring to FIG. 8B, all of the information necessary to document a deal is
18 pulled together through the screen below. The deal summary includes highly
19 structured information on parties, dates, terms, etc., as well as unstructured
20 information in the form of attachments. The bottom part of the page allows the
21 person registering the deal to designate the intended signatories. When the signers
22 affix their electronic signature, they are doing so to all of the documents in the deal,
23 including the attachments. These are archived and protected from tampering using
24 secure hash technology. In this way it is possible to create a reliable, on line
25 electronic signature to a complex deal, without risk of repudiation.

26 Note that any number of exhibits can be added to the UI device of FIG. 8B
27 since the list scrolls from the bottom each time a second exhibit is added. The user
28 interface has self-explanatory elements for defining information about the deal.

29 Anonymous Mail

30 For purposes of the following description, a "subscriber" is a person or entity
31 that subscribes to an anonymous mail system to be described below. Certain types
32 of negotiations and communications require anonymous initial contact, followed by
33 some period of anonymous discourse, leading to eventual disclosure of the parties'

1 identities. In the course of a typical sale or business deal, the initiating party begins
2 either by contacting one or more targeted potential trading partners or advertising to
3 a community of potential partners. While the identity of the initial offeror is usually
4 clear in any direct contact, it need not be so in advertising. In certain cases it could
5 be problematic for the initiating party to reveal his or her identity:

6 A party to a deal can have difficulty controlling the method of contact once
7 the party's identity is known. If a company is known to be in the market for office
8 space, for example, the party may be subjected to badgering by real estate firms
9 outside the established bidding process. Executives of the company may be contacted
10 directly in an effort to influence the decision.

11 Disclosure of intent may adversely affect the market. If a large company
12 begins to acquire land in an area, the price can rise very quickly. Simple exploration
13 of an option can make the option more costly or even impossible.

14 Disclosure of intent may adversely impact the reputation or standing of a
15 company. An insurance company that determines that it is over exposed to a certain
16 peril (e.g. hurricane losses in the Southeastern U.S.) would reveal that situation to
17 their competitors and investors by a large public solicitation.

18 While anonymity can be crucial for the initiator of a deal, it can be equally
19 important for the respondent for the same reasons. The need for controlled anonymity
20 has been addressed by several methods that were initially developed for paper
21 communications and have been extended to analogues in telephonic and computer
22 communications.

- 23 • Numbered mail boxes, including government and private
- 24 • Communications through a mediator
- 25 • Anonymous voice mail drops
- 26 • The use of pseudonyms in computer e-mail and dialogs.

27 These methods have several serious shortcomings:

- 28 • The method may only allow anonymity from one side.
- 29 • There is no inherent mechanism to validate the credentials and intent
30 on an anonymous party
- 31 • Use of a pseudonym may invalidate its future use by associating the
32 name with a specific party

- 1 • Manually mediated communications are slow

2 The creation and deletion of pseudonyms may not be completely
3 within the control of the party, imposing an overhead cost (in cash or labor)
4 and/or delay in creating a new name

- 5 • In most systems, a person with multiple pseudonymous mailboxes or
6 e-mail addresses will receive communications in several different places
7 (mailboxes or accounts), thus requiring multiple logons/passwords.

- 8 • Routing of messages received anonymously requires manual
9 forwarding to all relevant parties by the individual with access to the
10 anonymous mail box or email account.

- 11 • There is no mechanism to reveal actual identities in a secure and
12 mutually acceptable way.

13 The present invention addresses these deficiencies by providing two-way
14 anonymous communications, a central point of collection for messages sent to
15 multiple pseudonymous addresses, connection of multiple parties to a single
16 anonymous account, and a mechanism to reveal identities to all parties to a deal
17 simultaneously, by mutual consent. In summary, the anonymous mail system is a
18 server side system that allows clients to create anonymous handles on the fly. It also
19 allows them to share anonymous handles among multiple recipients so that the group
20 of recipients appears as a single recipient to the sender using the anonymous handle.
21 It is like a transparent mailing group. When mail is sent to an anonymous handle, it
22 is sent to all members of the group.

23 Multiple Systems – In contrast to the first-generation anonymous mail system, the
24 present system allows for multiple anonymous mail (Amail) systems. Each Amail
25 system operates in association with a conventional e-mail server, and uses the e-mail
26 server for communications with non-subscribers, subscribers to Amail systems other
27 than the local one, and for forwarding messages to the subscribers Email client
28 software.

29 Registration – Subscribers to an anonymous mail system (Amail) each complete a
30 registration that provides:

31 Contact information (name, address, telephone number, fax, etc.)

- 32 • Information to determine whether they the party is qualified to

1 participate in the communications exchange. For example, if the system were
2 to be used between and among real-estate agents, registrants to the system
3 might be required to supply a real estate license number.

- 4 • Association with an organization (if appropriate)
- 5 • Additional information on the individual or organization that may be
6 of use to others in the Amail system to determine the suitability of the party
7 as a partner in negotiations.

8 The additional information can include such factors as credit ratings, assets, or the
9 region in which the company does business. The specific information required
10 depends on the application. Insurance, real estate, energy marketing, etc. would all
11 have different data of interest.

12 Validation – Depending on the business model and role of the organization operating
13 the Amail exchange, the organization can either accept the information provided by
14 the subscriber, or verify the information and provide verification as part of the
15 service. Upon acceptance of a subscription applications and validation of the
16 background information if necessary, the use is assigned an Amail user ID and
17 password.

18 In the first version of the Amail system, logon was automatic from the general
19 application (CATEX); there was no separate user ID and password. In alternative
20 versions, the Amail system can provide its own user ID and password, with the
21 ability to bypass logon when it accessed from other applications with acceptable user
22 validation. All of the actual contact information and validation information are
23 maintained in a database. Validation information was not provided in the first
24 version of CATEX.

25 Assignment of an Email address – Each subscriber must provide an Internet
26 accessible Email address or be assigned an e-mail address in the Amail system. The
27 first version of the Amail required that the user have an Email address on the system.

28 The new version works directly with e-mail systems other than the Amail.

29 Logon – Subscribers access the Amail system by connecting an Amail web page
30 provided either over the Internet or on an Intranet. The subscriber enters a user name
31 and password. The first version of Amail was not browser-based and worked only
32 over a LAN or WAN, not over the Internet or an intranet.

1 Available functions – After logon, the subscriber can access the following functions:

- 2 • Manage aliases
- 3 • Compose an anonymous message
- 4 • Read Amail messages. In the original CATEX system, the user could
- 5 not access messages from within the Amail application.
- 6 • Log off

7 Managing Aliases – Aliases are directly under user control. After logon, a user can:

- 8 • Add a new aliases
- 9 • Delete an existing alias
- 10 • Create a free-form note associated with a new alias, or edit the note for an
- 11 existing alias that will be accessible to recipients from the alias.
- 12 • Identify other subscribers to whom messages to alias should be forwarded
- 13 • Identify other subscribers with permission to generate messages from the alias

14 These last two features make it possible for a group of subscribers to share an alias,
15 allowing them share communications and work together more effectively. The user
16 will:

17 Compose an anonymous message – After logon, a user can create and send an
18 anonymous message. After the option is selected, the system will display a message
19 creation screen with the following features:

- 20 1. A list of aliases currently owned by the user (i.e. created by the user and
- 21 not deleted), for the user to select the alias from which the message will
- 22 originate.
- 23 2. A subject box for the mail.
- 24 3. A list of the e-mail and alias addresses to which messages can be sent for
- 25 the user to select one or more. The original version could only send to one
- 26 alias. The user can also supply an Internet e-mail address off system.
- 27 4. A list of the e-mail and alias addresses to which copies of the messages
- 28 can be sent for the user to select one or more. The user may also supply an
- 29 Internet e-mail address off system. The original version did not include a
- 30 “CC” feature.
- 31 5. A space where the message can be typed, allowing for users to paste text
- 32 copies form another system using the Windows-based clipboard utility.

1 6. A check box to select whether the sender is willing to reveal his identify
2 to the recipient on mutual consent.

3 7. A check box to select whether the copies of the message should be sent to
4 other subscribers who share the Alias. The original version allowed only one
5 subscriber to access an alias.

6 Delivery of Messages – After an Amail message has been composed (see step 7), it
7 is delivered as follows.

8 1. The body of the email message is modified by adding a header including
9 routing information and an indication of whether the sender is willing to reveal
10 identities if there is reciprocal concurrence. The message would appear as shown
11 below. The items in italics are new since the original (prior art) version. The first
12 generation of the anonymous mail system did not allow for communications between
13 multiple Amail systems and, hence, did not list the Amail system name in the list of
14 respondents. The first generation system also did not allow for multiple recipients.

This message was sent anonymously from alias: Amail system name: alias
The message was sent to:
Amail system name: *alias*
Amail system name: *alias (cc)*
Amail system name: *alias*
The sender is willing to reveal identities.
[Original body of the message]

2. If the message is sent to a specific, non-anonymous e-mail address, Amail composes and transmits a standard Email message. The sender is listed as "amaill.admin.alias@xxxxxx" where "xxxxxx" is the address of the standard mail server supporting the mail system. Off-system access was not a feature of the first version.

3. If a message is sent to an alias on the local or any other related Amail system, and the owner of the alias has an off system email address, a message is sent as in step 1, above. In addition, however, the message is stored in an Amail message database for access through the Amail system interface. The original version did not have an Amail message database.

4. If a message has been sent to an alias for which there is no associated conventional mail account, the message is stored in the Amail message database. The Amail message database contains a repository for all messages, listing the subscriber(s) associated with the alias to which the message was addressed. The database contains the message (including sender, addressees, and ccs), date and time of transmission, and the alias of the subscriber to which the message was sent. The original version did not have an Amail message database.

5. If the option was checked to send copies to other that share the alias (see above), copies of the message are placed in the message database for the subscribers associated with each of the aliases.

Receipt of Messages – Messages sent from the Amail system can be received in a standard e-mail client by Amail subscribers and non-subscribers.

Amail subscribers can also receive messages through an Amail reader interface. All messages received are placed in the Amail message database (see above). Since an alias can be associated with more than one subscriber, the Amail message database can list more than one subscriber as an "owner" of the message even if it was sent to only one alias. When a user logs on and selects the option to

1 read Amail messages (see above) the messages are rendered as an HTML page
2 through a browser. Messages to all of the aliases associated with the user are
3 displayed. Each message has a hotlink to respond to send a message back to the
4 sending alias. Each message also has a link to display the background and validation
5 information and note associated with the alias (see above). The original version did
6 not provide an Amail viewer nor did it provide for display of validation information.
7 Responding from off System from Amail – Individuals from off system can respond
8 to Amail messages using the standard reply feature of their mail server. Messages
9 will be returned to the reply address (see above). Messages received by the
10 conventional e-mail server supporting the Amail system will forward the message to
11 the Amail message repository for the alias listed in the return address. Responding
12 from a standard Email client was not provided in the original version.

13 Flip Widget

14 Increasingly, computer applications are delivered through browsers over the
15 Internet or an intranet. There are many design considerations in building a system
16 for browser delivery in contrast to delivery as conventional client server application.
17 Two related considerations are the graphic richness of a browser screen and the time
18 lag to render a new screen. Partly because good web pages contain complex graphics
19 and partly because the Internet can be a relatively slow network, it is important to
20 design a web application to make few unnecessary wholesale screen changes. It is
21 more economical from the perspective of data transmission and, hence, from response
22 time, to create a “flat” rather than “deep” hierarchy of screens, and change only the
23 part of a screen that is minimally necessary.

24 For example, it is better in a data query to provide a single screen that allows
25 a user to specify a state and city within the state than to provide a first screen for the
26 state, followed by a second screen for the city. As the function of screens becomes
27 more complex, however, it becomes an increasingly difficult challenge to fit all of
28 the options onto the screen (particularly when a user selects a lower screen
29 resolution) and while maintaining a clean appearance. The invention described here
30 provides a tool that allows the Internet application developer to display an effectively
31 unlimited number of options in a very small space using a very familiar and intuitive
32 display feature.

33 Appearance – The “Flip Widget” tool renders a graphical object representing two

1 rows of file folders, overlapping. The labels on the front row are visible, the labels
2 on the second row are obscured by the front row of tabs, but the edges of the apparent
3 back tabs are visible. The number of the apparent tabs displayed in each row is a
4 function of the screen resolution and the length of the longest label entered by the
5 user.

6 The Flip Tab – In one embodiment, the rightmost tab on the front row is labeled
7 “FLIP”. When a user actuates this tab, the response is as described below.

8 Database of labels and links – In creating the display, the application programmer
9 enters a set of paired values. Each pair consists of (1) text of the label to be displayed
10 and a tab, and (2) the name of an HTML link, either within or external to the page to
11 be rendered when the tab is selected.

12 Action – Upon rendering a page containing the flip widget, the two-row tab display
13 shows the first “n” options from the list of labels and links. The value of “n”
14 represents the maximum number that can be displayed while allowing room for the
15 flip tab. Upon clicking any of these tabs, the corresponding link is executed. Upon
16 clicking the flip tab, the two-row tab display is changed to reflect the next “n” options
17 from the list of labels and links, retaining the flip tab on the right. If there are fewer
18 than n options remaining, the flip widget will either display the last n options, or
19 whatever number remain supplement by as many options are needed from the start
20 of the list. Clicking the flip tab when the list has been completed starts the cycle over
21 again with the first option.

22 Referring to FIGS. 9 and 10, a flip widget in a first state is shown in FIG. 9.
23 In the first state, any of the tabs A through E can be selected and the corresponding
24 set of controls displayed. For example, in FIG. 9, tab B has been selected and the
25 controls 430-432 are displayed. If the flip tab 410 is selected, a next row of tabs is
26 brought forward so that the display appears as in FIG. 10 with tabs F through J
27 showing. In FIG. 10, tab G has been selected and the corresponding controls 435-
28 437 are displayed.

29 FIGS. 9A and 10A show a more detailed example of how a flip widget can be
30 used to organize functions available to a user. For example, suppose that one
31 application is a commodity futures trading system that permits a user to execute
32 trades, review prices, and obtain other information relating to various metals such as
33 gold, silver, and platinum. As shown in FIG. 9A, for example, controls or functions

1 430, 431, and 432 (e.g., execute a trade, review current prices, and the like) are
2 associated with a "gold" category and can be invoked easily when that category is at
3 the forefront of the flip widget as shown. Clicking one of the other tabs (e.g., silver
4 tab 400) would bring the functions associated with that category to the forefront
5 while allowing the user to readily select other categories visible behind the front.
6 Clicking "other markets" tab 410 would change the selection of front-row tabs to a
7 different set of categories, as shown in FIG. 10A. The "other markets" tab 410 could
8 be continually clicked to rotate through a plurality of groupings of markets, each
9 having a set of functions or controls associated therewith.

10 A flip widget can be implemented in conjunction with the first or second
11 embodiments of the present invention in order to permit many different functions to
12 be displayed in a small screen space. The flip widget is a device to organize many
13 different functions in a logical way, and can be used as a tool for building an interface
14 to multiple applications. As one example, in a DCE (described in more detail
15 below), there may exist n functions (e.g. bulletin boards, chat rooms, e-mail, a-mail,
16 transaction engines, and the like) the specific availability of which can be defined by
17 a user who creates the collaborative environment. This collection can change over
18 time. Accordingly, the interface cannot be "hard coded" for a particular user.

19 One way to represent an indefinite (and potentially large) number of functions
20 in a small space is with tabs resembling a file folder, with a graphic element
21 representing hidden cards, implying that the user can reach the functionality on the
22 cards by paging (i.e. flipping) to them. The flip widget makes it possible to provide
23 a link to a list of applications maintained in a database rather than requiring that they
24 be hard coded. Programming logic for storing folder labels in a database, linking
25 those labels with associated functions and activating them using browser-type
26 buttons, and for performing the display features described above, are conventional
27 and no further elaboration is necessary. Although the "flip widget" provides one
28 method of structuring a user interface to structure a user's view of application
29 functions, other methods can of course be used.

30 B. DYNAMIC COLLABORATIVE ENVIRONMENT EMBODIMENT

31 In a second embodiment of the invention, a dynamic, user-defined
32 collaborative environment can be created in accordance with a set of tools and
33 method steps. As explained previously, this system differs significantly from

1 conventional networked environments in that: (1) the environment (including access
2 and features) is user-defined, rather than centrally defined by a system administrator;
3 (2) each environment can be easily destroyed after completion of its intended
4 purpose; (3) users can specify a group of participants entitled to use the environment
5 and can define services available to those participants, including offering
6 participation to unknown potential users; (4) the networked environment (including
7 access features and facilities) can cross corporate and other physical boundaries; and
8 (5) the environment offers a broad selection of tools that are oriented to
9 communication, research, analysis, interaction, and deal-making among potential
10 group members. Moreover, in a preferred embodiment, the environment is
11 implemented using web browser technology, which allows functions to be provided
12 with a minimum of programming and facilities communication over the Internet.

13 FIG. 11 shows various method steps that can be carried out to define, create,
14 and destroy an environment according to a second embodiment of the invention. The
15 term "environment" as used herein refers to a group of individuals (or computers,
16 corporations, or similar entities) and a set of functions available for use by that group
17 when they are operating within the environment. It is of course possible for one
18 individual to have access to more than one environment, and for the same functions
19 to be available to different groups of people in different environments.

20 The process of creating a collaborative environment involves the migration
21 of tools and information resources available in the library of the environment
22 generator into a specific collaborative environment. The collaborative
23 environment can include / link to any application available to the environment
24 generator. It can also include applications specific to the environment provided
25 that theses are accessible through Internet protocols.

26 Underlying the environment is a directory of users, information about
27 users, and their authorities. The core structure for the environment user database
28 should conform to a directory standard – typically DAP (Directory Access
29 Protocol) or LDAP (the lightweight directory access protocol). The environment
30 generator has access to its own directory of users and to the user directories of the
31 environments it has generated. The directory of an environment can be populated
32 initially by selecting users from the environment generator's directories. These
33 are added to the directory of the environment in one of two ways depending on the

1 specific implementation. Directory records can be copied from the environment
2 generators user database to a separate database for the environment or a flag can
3 be added to the user data record in the environment generators users database to
4 indicate that the user has access to the environment. The second, simple model is
5 useful when all users in an environment have equal authority. A separate user
6 database (directory) is necessary for an environment when the environment has its
7 own security / authority model.

8 Additional members can be added through a set of standard application /
9 subscription routines. These then become known to the environment generator (as
10 well as the specific environment) providing the foundation for greater speed and
11 efficiency in creating subsequent environment.

12 Beginning in step 1101, a new group is created by identifying it (i.e., giving
13 it a name, such as "West High School Research Project," and describing it (e.g.,
14 providing a description of its purpose). The process of creating a group and defining
15 functions to be associated with the group can be performed by a user having access
16 to the system without the need for system administrator or other similar special
17 privileges (e.g., file protection privileges, adding/deleting application program
18 privileges, etc.). In this respect, environments are, according to preferred
19 embodiments, completely user-defined according to an easy-to-use set of browser-
20 driven user input screens. The principles described herein are thus quite different
21 from conventional systems in which a central system administrator in a local area
22 network can define "groups" of e-mail participants, and can install application
23 programs such as spreadsheets, word processing packages, and the like on each
24 computer connected to the network. Moreover, according to various preferred
25 embodiments, the facilities provided to group members can be provided through a
26 web-based interface, thus avoiding the need to install software packages on a user's
27 computer.

28 It is also contemplated that various methods of obtaining payment for creating
29 or joining groups can be provided. For example, when a new environment or group
30 is created, the person or entity creating the group can be charged a fixed fee with
31 payment made by credit card or other means. Alternatively, a service fee can be
32 imposed based on the number of members that join, the specific functions made
33 available to the group, or a combination of these. Moreover, fees could be charged

1 to members that join the group. The amount of the fee could also be based on the
2 length of time that the environment exists or is used.

3 Although not specifically shown in FIG. 11, step 1101 can include the step
4 of creating a new entry in a database table (e.g., a relational or object-oriented
5 database) to store information concerning the new group and the environment in
6 which the group will operate. Database entries related to the group, including some
7 or all of the information described below, can be created as the environment is
8 defined. It is assumed that one or more computers are linked over a network as
9 described in more detail below in order to permit the environment to be created, used,
10 and destroyed, and that a database exists on one or more of these computers to store
11 information concerning the environment.

12 In step 1102, the group members are identified. According to various
13 embodiments, the group members can be identified in three different ways (or
14 combinations thereof), as indicated by sub-steps 1102a, 1102b, and 1102c in FIG. 11.

15 It is contemplated that group members can span physical networks and computer
16 systems, such as the Internet. Consequently, group members can include employees
17 of different corporations, government agencies, and the like. In contrast to
18 conventional virtual private networks, both the group members and the functions
19 made available to those group members are entirely user-selected, thus permitting a
20 broad range of persons to easily create, use, and destroy virtual private networks and
21 associated functionality.

22 First, in step 1102a, group members can be identified by selecting them from
23 a list of known users that are to be included in the group. For example, within a
24 corporation or similar entity, a list of internal e-mail addresses can be provided, or
25 an electronic version of a phone list or other employee list can be provided. If the
26 hosting computer system is associated with a school, then a list of students having
27 accounts on the computer (or those in other schools that are known or connected to
28 the host) can be provided. From outside a corporate entity, users can be selected
29 based on their e-mail addresses (e.g., by specifying e-mail addresses that are
30 accessible over the Internet or a private or virtually private network). In this step, the
31 environment creator specifies or compels group members to belong to the group.

32 Second, in step 1102b, group members can be invited to join the group by
33 composing an invitation that accomplishes that purpose. For example, a group

1 creator may choose to send an invitation via e-mail to all members of the corporation,
2 or all members of a particular department within the corporation, all students in a
3 school or region, or members of a previously defined group (e.g., the accounting
4 department, or all students in a particular teacher's class). The invitation would
5 typically identify the purpose of the group and provide a button, hyperlink, or other
6 facility that allows those receiving the invitation to accept or decline participation in
7 the group. As those invited to join the group accept participation, their responses can
8 be stored in a database to add to those members already in the group. Invitations
9 could have an expiration date or time after which they would no longer be accepted.
10 As invitees join the group, the group creator can be automatically notified via e-mail
11 of their participation.

12 Third, in step 1102c, group members can be solicited by way of an
13 advertisement that is sent via e-mail, banner advertisement on a web site, or the like.
14 Persons that see the advertisement can click on it to join the group. It is also possible
15 for advertisements to have a time limit, such that after a predetermined time period
16 no more responses will be accepted. The primary difference between advertising
17 participation in a group and inviting participation in a group is that invitations are
18 sent to known entities or groups, while advertisements are displayed to potentially
19 unknown persons or groups.

20 It will be appreciated that group members can be selected using combinations
21 of steps 1102a, 1102b, and 1102c. For example, some group members can be
22 directly selected from a list, while others are solicited by way of invitation to
23 specifically identified invitees, and yet others are solicited by way of an
24 advertisement made available to unknown entities.

25 In step 1103, the functions to be made available to the group are selected. For
26 example, the group can be provided with access to an auction transaction engine; a
27 survey tool; research tools; newswires or news reports; publication tools; blackboard
28 facilities; videoconferencing facilities; and bid-and-proposal packages. Further
29 details of these facilities and tools are provided herein. The group creator selects
30 from among these functions, preferably by way of an easy-to-use web browser
31 interface, and these choices are stored in a database and associated with the group
32 members. Additionally, the group creator can specify links to other web-based or
33 network-based applications that are not included in the list by specifying a web site

1 address, executable file location, or the like. The group creator can also define shared
2 data libraries that will be accessible to group members.

3 In step 1104, the environment is created (which can include the step of
4 generating a web page corresponding to the group and providing user interface
5 selection facilities such as buttons, pull-down menus or the like) to permit group
6 members to activate the functions selected for the group. In some embodiments,
7 access to the group may require authentication, such as a user identifier and password
8 that acts as a gateway to a web page on which the environment is provided. Other
9 techniques for ensuring that only group members access the group functions and
10 shared information can also be provided. A web page can be hosted on a central
11 computer at an address that is then broadcast to all members of the group, allowing
12 them to easily find the environment.

13 In step 1105, group members collaborate and communicate with one another
14 using the facilities and resources (e.g., shared data) available to group members. In
15 the example provided above, for example, a group of high school students
16 collaborating on a school research project could advertise for survey participants;
17 conduct an on-line survey; compile the results; communicate the results among the
18 group members; brainstorm about the results using various brainstorming tools;
19 conduct a videoconference including group members at various physical locations;
20 compile a report summarizing the results and exchange drafts of the report; and
21 publish the report on a web site, where it could optionally be offered for sale through
22 the use of an on-line catalog transaction engine. The group could even contact a
23 book publisher and negotiate a contract to publish the report in book form using bid
24 and proposal tools as described herein.

25 In step 1106, after the environment is no longer needed, it can be destroyed
26 by the person or entity that created the group. Again, in contrast to conventional
27 systems, the destruction of the environment is preferably controlled entirely by the
28 user that created the environment, not a system administrator or other person that has
29 special system privileges. Destruction of the environment would typically entail
30 deleting group entries from the database so that they are no longer accessible.

31 FIG. 12 shows one possible system architecture for implementing the steps
32 described above. As shown in FIG. 12, an Internet Protocol-accessible web server
33 1201 is coupled through a firewall 1202 to the Internet 1203. The web server includes

1 an environment generator 1201a which can comprise a computer program that
2 generates user-defined environments as described above. Further details of this
3 computer program are provided herein with reference to FIG. 21.

4 Web server 1201 can include an associated system administrator terminal
5 1204, one or more CD-ROM archives 1205 for retaining permanent copies of files;
6 disk drives 1206 for storing files; a database server 1207 for storing relational or
7 object-oriented databases, including databases that define a plurality of user-
8 controlled environments; a mail server 1208; and one or more application servers
9 1209 that can host application programs that implement the tools in each
10 environment. Web server 1201 can also be coupled to an intranet 1210 using IP-
11 compatible interfaces. Intranet 1210 can in turn be coupled to other application
12 servers 1211 and one or more user computers 1212 from which users can create,
13 participate in, and destroy environments as described herein, preferably using
14 standard web browsers and IP interfaces. Web server 1201 can also be coupled to
15 other user computers 1217 through the Internet 1203; to additional application
16 servers 1215 through another firewall 1216; and to another IP-accessible web server
17 1213 through a firewall 1214.

18 It will be appreciated that the system architecture shown in FIG. 12 is only
19 one possible approach for providing a physically networked system in which user-
20 defined network environments can be created and destroyed in accordance with the
21 principles of the present invention. It is contemplated that application programs that
22 provide tools used in a particular user-defined environment can be located on web
23 server 1201, on user computers 1217, on application servers 1215, on application
24 servers 1209, on application servers 1211, or on any other computer that provides
25 communication facilities for communicating with web server 1201. It will also be
26 appreciated that web pages that provide access to each user-defined environment
27 need not physically reside on web server 1201, but could instead be hosted on any
28 of various computers shown in FIG. 12, or elsewhere.

29 Reference will now be made to exemplary steps and user interfaces that can
30 be used to carry out various principles of the invention, including steps of creating
31 a group, selecting group members, and defining functions to be made available to
32 group members in the environment.

33 FIGS. 13A through 13C show one possible user interface for creating a group

1 and identifying group members. In FIG. 13A, a user gains access to an environment
2 creation tool by way of an authentication process. This may be a simple username
3 and password device as shown in FIG. 13A, or it could be some other mechanism
4 intended to verify that the user has access to the environment creation tool. In the
5 case of a corporation, school, or other entity that already provides a log-in procedure
6 to access the entity's network, such log-in procedure could serve to authenticate the
7 user for the purpose of creating a new environment. It should be appreciated that
8 user authentication is not essential to carrying out the inventive principles.
9 Moreover, although it is contemplated that for ease of use (and to minimize
10 programming) web browsers and web pages be used to receive user-defined
11 information to create each environment, other approaches are of course possible.

12 In FIG. 13B, the user is prompted to create a new group by supplying a group
13 name (e.g., "Joe's Homework") and a brief description of the group. This
14 information is preferably stored in a database file and associated with group members
15 and functions available to those group members.

16 In FIG. 13C, the user is prompted to identify group members. As described
17 previously, group members are preferably identified in one of three ways (or
18 combinations of these): (1) selection from a list of known group members; (2)
19 inviting known candidates to join the group; or (3) advertising for new members.
20 When the user clicks one of the options in FIG. 13C, he or she is prompted to supply
21 additional information as shown in FIGS. 14A through 14C.

22 Beginning with FIG. 14A, for example, group members can be individually
23 specified by entering an e-mail address (e.g., an internal or external e-mail address)
24 in a text form data entry region and/or by selecting from a previously known list.
25 This screen permits the user to compel attendance in the group by specifying names
26 and/or e-mail addresses to which group messages will be sent. All those added to the
27 group in this manner will be provided with access to the environment corresponding
28 to the group. Aliases and pre-defined groups could also be specified as the basis for
29 membership (e.g., all those in the accounting department of a corporation, or all
30 students in a high school).

31 Each member of a group might have a group email account, or they may use
32 an off-system email account. Off-system email addresses can be maintained in a
33 database of users. Mail sent to the group email address is preferably forwarded off-

1 system, protecting the actual email address of the person unless that person wishes
2 to give out that address. New members can be added until the group is completed.
3 Although not explicitly shown in FIG. 14A, it is contemplated that new members
4 can be added to a previously defined group after the environment has already been
5 created.

6 When group members are selected or specified, the user creating the
7 environment can also create a password for each user in the group in order to enable
8 those in the group to access the environment. Alternatively, when a user visits the
9 environment, the environment can retrieve a "cookie" from the user's computer to
10 determine whether the user is authorized to access the environment. If no cookie is
11 available, the user could be prompted to supply certain authentication information
12 (e.g., the company for whom he or she works, etc.) In yet another approach,
13 authentication could occur by way of e-mail address (i.e., when the user first visits
14 the environment, he or she is prompted to enter an e-mail address). If the e-mail
15 address does not match one of those selected for the group, access to the environment
16 would be denied.

17 Turning to FIG. 14B, prospective group members can also be "invited" to join
18 the group. The user creating the environment can specify one or more e-mail
19 addresses to which an invitation will be sent. The invitation can be a simple text
20 message, or it could be a more sophisticated video or audio message. An expiration
21 date can also be associated with the invitation, such that responses to the invitation
22 received after the date will not be accepted. Software resident in web server 1201
23 (FIG. 12) receives responses to the invitations and adds members to the appropriate
24 group or drops them if the expiration date has passed or the prospective group
25 member declines participation. Prospective members can join the group by sending
26 a reply with a certain word in the message (e.g., "OK" or "I join"); by clicking on a
27 button in an e-mail message; or by visiting a web site identified in the invitation.

28 Turning to FIG. 14C, group members can also be solicited by creating an
29 advertisement directed primarily at potential group members that are unknown. The
30 advertisement could include, for example, a banner ad comprising text, video, and/or
31 audio clips. The graphic should conform to the size designated for the ad on the web
32 page. The ad could be posted on a web site by uploading the graphic through a web
33 interface and, optionally providing a URL on the screen of FIG. 14C to link to if the

1 advertisement is clicked. Software on the group page can render advertisements on
2 a page either (a) every time the page is displayed, (b) in rotation with other ads; or
3 (c) when characteristics of the user match criteria specified for the ad.

4 The advertisement can include an expiration date after which responses would
5 no longer be accepted. Advertisements could range from the very specific (e.g., an
6 advertisement posted on a school's home page advertising participation in Joe's
7 research project on drug use at the school) to more general (e.g., an advertisement
8 that says "we're looking for minority contractors looking to establish a long-term
9 relationship with us" that is posted on web sites that cater to the construction
10 industry.

11 A qualification option can also be provided to screen prospective group
12 members. For example, if an advertisement seeks minority contractors to participate
13 on a particular construction project, selecting the "qualify" option would screen
14 responses by routing them to the user that created the group (or some other authority)
15 before the member is added to the group. Those responding to the advertisement
16 could be notified that they did not pass the qualifications for membership in the
17 group, or that further information is required (e.g., documents evidencing
18 qualifications) before participation in the group will be permitted. Alternatively, an
19 automatic qualification process can be provided to allow a prospective member to
20 join if the person fills in certain information on the response (e.g., e-mail address,
21 birthdate that meets certain criteria, or the like).

22 As shown in FIG. 15, a banner ad displayed on a web site invites minority
23 contractors to join a group that bids on information technology contracts. Those
24 interested in the advertisement click a button, which leads them to another site (not
25 shown) requiring that they provide certain information (qualification information,
26 name, age, company registration information, etc.) This information is then
27 forwarded to web server 1201 which either pre-screens the information according to
28 pre-established criteria, or notifies the user creating the group that a prospective
29 member has requested access to the group. In the latter case, the user could screen
30 the applicant and grant access to the group.

31 FIG. 16 shows one possible user interface for selecting communication tools
32 to be made available to group members. This screen can be presented to the user
33 creating the environment after the group has been identified and its members

1 selected. It is contemplated that a variety of communication tools can be provided,
2 including a bulletin board service; advertisements; white pages (e.g., a listing of
3 members, their e-mail addresses, telephone numbers, and the like); yellow pages
4 (e.g., a listing of services or companies represented by group members, with
5 promotional and contact information); document security (e.g., shared access secure
6 document storage services); anonymous e-mail (described above with respect to the
7 first embodiment); threaded dialogs; a group newsletter creation tool;
8 videoconferencing; and even other user-provided applications that can be specified
9 by name and location (e.g., URL). Details of these services are provided below.

10 According to various preferred embodiments, dynamic collaborative
11 environments are designed to integrate tools from multiple sources provided that they
12 are web-accessible (i.e., they operate according to Internet Protocol and/or HTML-
13 type standards). The categories listed above provide a reasonable taxonomy of the
14 tools necessary for collaboration, but this list can be extended to include virtually
15 every class of software such as computer-assisted design, engineering and financial
16 analysis tools and models, office applications (such as word processing and
17 spreadsheets), access to public or proprietary databases, multimedia processing and
18 editing tools, and geographic information systems. The following describes some
19 of the communication tools that can be provided:

20 Bulletin boards. A bulletin board (see, e.g., FIG. 2) lists notices posted by
21 group members, which may be offers to buy or sell, but need not be limited to such
22 offers. Many types of bulletin board services are of course conventional and no
23 further discussion is necessary in order to implement one of these services.
24 Nevertheless, in one embodiment the following data items (attributes) can be
25 provided for each notice appearing on the bulletin board: an item number, a title, the
26 date posted, and one or more special attributes defined by the user. The attributes
27 may include a field to indicate whether a listing is a "buy" or "sell" offer. The board
28 can be provided with an integrated sorting capability. By clicking on the heading
29 of each column, the user can sort the entries in, alternately, ascending or descending
30 order. Thus, it is possible to organize the records from oldest to newest or newest to
31 oldest, or to separate buy and sell offers. To limit the values on a board, a search
32 capability can also be provided, such that only those entries that meet the search
33 criteria are displayed.

1 Advertisements. In a typical environment of a dynamically created network
2 there are a number of fixed places for advertisements – the top of a page for a banner,
3 the bottom of a page for a banner, and space on the side for small ads. The creator
4 of the environment may choose to use none, any, or all of these spaces for
5 advertisements. Once a space is designated for advertising, group members may
6 place adds by completing a template that provides payment information (if required),
7 the text for the ad (any standard image format), and a link to be executed if the ad is
8 clicked by someone viewing the ad.

9 Each user is responsible for providing functionality behind the link. The ad
10 may be displayed persistently (every time a page is displayed), in rotation with other
11 ads for the same place, or may be triggered on the basis of user characteristics
12 including purchasing history. Revenue can be collected for placement (fixed price
13 regardless of how many times an ad is displayed), per time that the ad is displayed,
14 or per click on the ad. The virtual private network provides the front-end to facilitate
15 online placement of the ad. Display can be done by linking pages to standard ad
16 display code, available off the shelf from several sources. This code provides for
17 rotation of the ads. Software for customization (i.e. choosing the ad based on user
18 characteristics) is available commercially from several sources.

19 White pages. White pages provide a comprehensive listing or directory of
20 members with information about them and information regarding how to contact
21 them. Various types of commercially available software can be used to manage such
22 directories, and it is elementary to code typical directories that have fixed contents
23 for each member.

24 A web-accessible directory can be used in accordance with various
25 embodiments of the invention. One type of directory that can be provided differs
26 from directories having fixed structures. The key differences are as follows:

27 (a) User control over information Users enter and maintain their own
28 information directly, rather than through a central organization. This provides more
29 immediate update of data and reduces transcription errors. It makes it simple, for
30 example, for people to change their phone number when they are temporarily
31 working at another location.

32 (b) Multiple points for quality control. The data regarding each user can be
33 displayed to the user periodically (e.g. 30, 60, and 90 days), and the user prompted to

1 update and verify the data. A feedback capability can be provided for members of
2 a group to report errors they find. Email addresses can be "pinged" periodically to
3 determine if they still exist. In addition, server management staff can periodically
4 review accounts that have had recent activity.

5 (c) Object structure. A directory entry consists of a collection of data
6 elements. These elements include such things as name for addressing (Dr. John D.
7 Smith), sort name (Smith, John D), or primary work telephone (800-555-1212).
8 Traditional mail systems have a fixed number of rigidly formatted elements. In one
9 embodiment, a more flexible approach can be used in that individuals identify which
10 elements they wish to add to the collection comprising their directory entry. For
11 example, a person can add 3, 4, 5 or more telephone numbers attaching a note to each
12 explaining its use (e.g. "for emergencies after 8PM").

13 (d) Direct link to communications tools. Where a directory refers to a contact
14 method (e.g. a telephone number), the method can be invoked directly from an entry
15 if the necessary software is available. For example, phone number can be dialed,
16 email messages initiated, or a word processing session initiated with letter and
17 envelope templates, preloaded with address information.

18 (e) Descriptive information. In addition to contact information, each directory
19 can contain information describing the entry (individual or business). The
20 description can be different in each group or it can be the same. The descriptive is
21 free form, with the exception that the user may drop in terms from a group-specific
22 lexicon. This lexicon can include terms specific to the industry (e.g. "fuel system")
23 for the automotive industry, or preferred forms of standard terms (e.g. "California"
24 rather than "CA", "Ca", or "Calif."). Standardization of terms in this way makes
25 search the directory more reliable.

26 Yellow pages. Conventional "yellow pages" products provide a one level
27 classification of directory entries designed to facilitate identification of and access
28 to an individual or organization with specific interests and capabilities. Within
29 industries, and particularly online, multi-level hierarchical directories are common,
30 with the multiple levels providing more precise classification. There are numerous
31 commercial products for maintaining online yellow page type classification systems.

32 Any web-accessible directory can be connected to a DVPN group. A
33 preferred method offered with the system integrates the classification system with the

1 descriptive field in a directory entry. Every time a standard term pertaining to a
2 classification is pulled from the lexicon, the entry is added to that classification in the
3 hierarchical sort. In addition to hierarchical access, this correspondence between the
4 traditional hierarchical sort and the free-form description with standardized terms
5 makes it possible to access records via search rather than browsing the hierarchy.
6 Searching makes it possible to identify an organization with multiple capabilities
7 (e.g. "brake repair" and "frame straightening"). This search capability is much like
8 a general web-search using a tool like AltaVista's or Inktomi's search engine and can
9 use the same search engine, but differs in that material being search is in a precisely
10 defined domain (group members), the information being searched is limited and
11 highly quality controlled (i.e. group directory entries), and has a precision rooted in
12 a precise vocabulary (the lexicon used in preparing the description).

13 Document repository. Any commercial web-enabled document repository
14 can be integrated into a group. Examples are Documentum and PC DOCs. An
15 improved version offered specifically with the DVPN package was described above.

16 Document security. Within the document repository various tools can be
17 provided to protect the security of documents. These include (1) limiting access to
18 a document to certain people or groups; (2) only displaying the directory entry for
19 documents to people who can access it; (3) password protection; (4) encryption; (5)
20 secure archive in read only mode on a third-party machine; (6) time-limited access
21 and (7) a secure hash calculation.

22 All of the above are conventional except for time-limited access and the
23 secure hash calculation. Software for limiting access to a document to a certain
24 period is available from Intertrust, among others. A secure hash is a number that is
25 characteristic of the document calculated according to a precisely defined
26 mathematical algorithm. There are several secure hash algorithms, and implementers
27 can develop their own. They are "trap door" in nature. That is, the calculation can
28 be performed with reasonable effort, but the inverse of the function is
29 computationally intractable. The classic example of a trap door function is
30 multiplication of very large prime number (on the scale of hundreds of digits). The
31 product can be calculated with relative ease, but factoring the product (the inverse
32 function) is very time consuming, making it effectively impossible with generally
33 available hardware. This method is used in public key encryption, but can be applied

1 equally well in secure hash, though other trap door functions are preferred, in
2 particular, the one specified by the U.S. Department of Commerce as FIPS standard
3 180. Code to implement this standard can be developed from published algorithms.

4 Anonymous e-mail (described above with respect to the first embodiment);
5 Threaded dialogs. Threaded dialogs are a collection of messages addressing
6 a specific topic, added serially, not in real time. They are threaded in the sense that
7 new topics can branch off from a single topic, and topics can merge. According to
8 one embodiment, threaded dialogs differ from conventional news group functionality
9 in that (1) users can initiate new topics; (2) users can post a message to one topic,
10 then indicate that the message pertains to other topic as well; (3) browsers reading a
11 message may continue down the original thread or one of the alternates if other topics
12 are suggested.

13 Group newsletter creation tool. A newsletter creation tool can be used to link
14 columns provided by multiple users (and maintained as separate web documents) into
15 a whole through an integrating outline maintained by an "editor". The purpose of
16 the tool is to provide the look and feel of an attractive single document to a disparate
17 collection. To create the newsletter the editor generates an outline identifying an
18 author for each component and a layout. Art for the first page can be provided.
19 Through messaging, the authors are provided a link to upload their content. Content
20 is templated to include a title, date, a by line, one or more graphic elements, a
21 summary for the index, and text. The editor may allow documents to go directly to
22 "publication" or require impose a review and editing step.

23 Chat groups. Real time chat room software is widely available from many
24 sources including freeware and shareware.

25 Audio and videoconferencing. Commercially available tools for web-based
26 audio and video conferencing can be included in the group functionality. Examples
27 are Net Meeting and Picture Tel software.

28 FIG. 17 shows one possible user interface for selecting research tools to be
29 made available to group members. As shown in FIG. 17, various tools such as a
30 mortgage calculator, LEXIS/NEXIS access, news services, Valueline, and other
31 research tools can be provided by checking the appropriate box on the display. All
32 of these research tools are conventional and commercially available (via web-based
33 links and the like).

FIG. 18 shows one possible user interface for selecting transaction engines to be made available to group members. As shown in FIG. 18, many different types of transaction engines can be provided to group members, including electronic data interchange (EDI) ordering; online catalog ordering; various types of auctions; sealed bids; bid and proposal tools; two-party negotiated contracts; brain writing (moderated online discussion) and online Delphi (collaborative estimation of a numerical parameter). The following describes various types of transaction engines in more detail. Enhanced features (i.e., those that differ from conventional products) are highlighted in gray text.

A. Order placement (online catalog) transaction engine

An order placement or online catalog engine allows the buyer to place an order for a quantity of items at a stated fixed price, essentially ordering from an online catalog. The catalog contains the description and specification of the offerings. The catalog may be publicly accessible (Subtype 1a) or provided for a specific customer (Subtype 1b). Prices are included in the catalog but may be customer specific, may vary with quantity purchased, terms of delivery and performance (e.g. cheaper if not required immediately). The catalog can represent a single company's offering or an aggregate of the offerings from several companies. The catalog can range from a sales-oriented web site designed for viewing by customers, to a engine designed only accept orders sent via electronic data interchange (EDI). Note that the catalog can be shopper oriented (i.e. designed to sell) or a simple, machine-readable list of available items and prices. The following describes in more detail steps that can be executed to create an online catalog:

1. Enter and maintain a framework for catalog

1.1. Enter / delete / edit categories. Categories are titles for groups of items, such as "furniture" or "solvents"

1.2. Enter / delete / edit subcategories. Subcategories are categories within categories, effectively establishing a hierarchy of products. Example: furniture/dining room/tables.

1.3. Create groups of categories and subcategories (e.g. "see also...."). The grouping allows a person browsing items to be referred to another category that may contains items of interest. For example, someone may reach the furniture/dining room/tables and then be referred to

- 1 furniture/office/conference room tables where other suitable tables may be
 2 listed, or to furniture/dining room/chairs to buy chairs that make the table.
 3 This cross-referencing transforms the hierarchical arrangement of
 4 categories into a web.
- 5 2. Enter / edit / delete items in catalog by entering and updating the information
 6 listed below. The system allows users to enter this information and provides
 7 basic quality assurance.
- 8 2.1. Catalog item number
 9 2.2. Supplier part number(s)
 10 2.3. Name of item
 11 2.4. Description
 12 2.5. Photos and drawings
 13 2.6. Specifications (depends on item type). Different items have different
 14 specifications. For example, a computer printer can have color vs. black
 15 and white, dots per inch resolution, paper size, etc. In contrast to a fixed,
 16 hard coded catalog, the specification section of the general purpose
 17 catalog engine the user prepares the specification section by selecting
 18 parameters from a list and then specifying a value for that parameter.
 19 The parameter list contains values such as length, width, height, voltage,
 20 color, resolution etc. It is can be extended by the manager of the auction
 21 environment. A lister selects a necessary parameter (e.g. length, then
 22 enter the value, such as 14"). The specification section is a concatenation
 23 of individual specifications.
- 24 2.7. First available date
 25 2.8. Last available date
 26 2.9. Category (categories) into which the item fits
 27 2.10. Alternate suggestion(s) if product not available
 28 2.11. Related and associated products (e.g. printer supplies for a printer or other
 29 household items with the same pattern.
 30 2.12. Additional information at the option of the individual or organization
 31 listing the item.
- 32 3. Enter / update pricing information
 33 3.1. Simple price. The fixed prices is per item or per unit. The price must

1 specify the

2 3.2. Pricing algorithm -- link to code for pricing algorithm

3 4. Take Orders

4 There are two variants: 4a: manual purchase in which a person browses a catalog
5 and selects an item for purchase and 4b: automated order in which a purchase
6 is initiated by an electronic message.

7 Variant 4a: Manual Purchase

8 4.1. Potential buyers access the catalog by drilling down through the category
9 / subcategory tree or

10 4.2. Buyers search fields in catalog to identify the appropriate item. The search
11 may examine the title, description, or any of the specification fields.

12 4.3. Display general information for item(s) meeting specifications

13 4.4. Allow user to modify search or to select specific item if the items displayed
14 do not meet his requirements

15 4.5. Display detailed information for selected item

16 4.6. Display the fixed price or calculate price if price is based on an algorithm.

17 The pricing algorithm may include parameter such as characteristics or
18 affiliation of the users (e.g. affiliated with a pre-negotiated discount
19 program), delivery date and mode, and quantity.

20 4.7. Offer the option to purchase or search again if they choose not to purchase.

21 4.8. If the buyer opts to proceed with the purchase, then check the availability of
22 the item by linking to the seller's inventory system

23 4.8.1. If the item is available then execute an 'add to basket'. That is, place
24 it on a list of items designated for purchase.

25 4.8.2. If the item is not available, then execute the contingent response:

26 4.8.2.1. Offer delivery at predicted date

27 4.8.2.2. Terminate the sale, but offer to deliver or notify when next the
28 item is next available.

29 4.8.2.3. Suggest alternate items

30 4.8.2.4. Report 'sorry' and abort transaction

31 4.9. Offer option to purchase additional options

32 4.9.1. If offer is accepted, execute from step 4.1

33 4.9.2. If offer is not accepted, proceed with step 4.10

1 4.10. Conclude the transaction

2 4.10.1. Collect shipping information, offer options

3 4.10.2. Collect payment information

4 4.10.3. Validate payment

5 4.10.4. Summarize order

6 4.10.5. Obtain final authorization

7 4.10.6. Generate receipt

8 Variant 4b: automated order, done using an EDI (electronic data interchange)

9 message

10 4.1 Accept requests for item

11 4.2 Return price and confirmation of availability

12 Note that users may conduct transactions without employing EDI. It is
13 possible, however, for members to agree on a transaction EDI format either by
14 completing a template within the system or selecting a pre-established EDI format
15 from a library. This library can include formats developed by recognized standards
16 organizations (e.g. UNEDIFACT or ANSI) or formats developed specifically for an
17 industry or a trading environment. Once there is agreement on a format, transactions
18 can be initiated, concluded, and confirmed through the exchange of appropriate EDI
19 messages. As many commercial ordering, accounts payable, accounts receivable and
20 enterprise resource planning systems have an EDI interface the collaborative
21 environment should have the capability to forward the message to the order
22 fulfillment system.

23 B. English Auction Transaction Engine

24 In an English Auction, a single item is offered for sale to many buyers. The
25 auction can be open or limited to pre-qualified bidders. The buyers offer bids in turn,
26 each succeeding all prior bids. The highest bid received at any point in the auction
27 is visible to all buyers. The identity of the highest bidder may or may not be visible
28 to traders. Buyers may increase their bids in response to this information. Award
29 is to the highest bidder at the end of trading. The end of trading is reached when
30 there are no higher bids during an interval that may be formally defined or
31 determined by the manager of the auction at the time of execution.

32 There are two models for the access to the transactions. In the first model,
33 all buyers and sellers are members of the group. In the second model, all sellers are

1 members of the group, but buyers can include members and non-members. If non-
2 members are allowed to buy, the creator the transaction must enter a new URL for
3 buyers. This is a sub-URL of the main group URL. A registration process may be
4 established for the buyer URL.

5 In live auctions (as opposed to online) all traders are connected at the same
6 time, and the duration of the auction is brief – typically only a few minutes. In online
7 trading, it is not necessary for all of the bidders to be present (i.e. connected at the
8 same time). To distinguish between these two options they are designated (a)
9 concurrent (everyone bidding at the same time) and (b) batch (not everyone
10 connected simultaneously. The manager of the auction can set the minimum bid
11 and the minimum increment.

12 1. The first step in conducting an auction is to collect information on the items being
13 offered for sale. This is done online. The information collected includes:

14 1.1. Identity of seller. Note that the business rules of the auction may require
15 advance registration of sellers to verify their identity.

16 1.2. Descriptions, optionally including attachments and photographs, independent
17 certifications or appraisals, and anything else in digital form necessary or
18 useful in determining the value of the item.

19 1.3. Reserve price

20 1.4. Minimum increment

21 1.5. Time offered for sale

22 1.6. Time bidding is scheduled to end

23 1.7. Verify the seller's consent to the rules of the auction house regarding
24 delivery, payment, responsibility for non payment, etc.

25 2. If the business rule of the auction house is to require payment up front, collect
26 payment either by:

27 2.1. Debiting a deposit account

28 2.2. Charging to account for billing

29 2.3. Collecting online payment such as through a credit card.

30 3. Post information about auction, including:

31 3.1. Description of items to be auction

32 3.2. Auctions rules:

33 3.2.1. Qualification process for bidders

- 1 3.2.2. Time of bidding
- 2 3.2.3. Criterion for ending bidding – time between bids
- 3 3.2.4. Legal statement – responsibilities of buyer and seller, limitation of
- 4 liability
- 5 4. Execute qualification process (optional)
- 6 4.1. Admit bidders who are qualified based on past participation
- 7 4.2. Provide fill-in-the blank qualification form new bidders
- 8 4.3. Collect information
- 9 4.4. Conduct automated review or manual review
- 10 4.5. Inform prospective bidder of qualification or not

11 Variant (a): concurrent auction

12 5. Conduct Auction

- 13 5.1. Fifteen minutes prior to appointed time for auction, display “Welcome”
- 14 screen with space for qualified bidder to enter an alias or handle to be used
- 15 in the auction. Screen should have a description of the object. Show time
- 16 until auction starts. Auto refresh at 15 second intervals.
- 17 5.2. At appointed time, display the main auction page with the following
- 18 information:
- 19 5.2.1. Description / picture of item for auction stored in a separate, static
- 20 frame of the PC so that it does not need to be downloaded each cycle.
- 21 5.2.2. Current bid (initially the reserve price)
- 22 5.2.3. Suggested next bid (e.g. current + 3 * increment)
- 23 5.2.4. Button to accept suggested next bid
- 24 5.2.5. Field to enter bid higher than suggested next
- 25 5.2.6. Handle of the highest bidder
- 26 5.3. Refresh main auction page at 15 second intervals
- 27 5.4. Collect bids, either
- 28 5.4.1. Notice that the suggested bid was accepted
- 29 5.4.2. Bid higher than accepted bid
- 30 5.4.3. If new bid is lower than current highest, discard
- 31 5.4.4. If higher than current highest then
- 32 5.4.4.1. Log identity of highest bidder
- 33 5.4.4.2. Update highest bid

- 1 5.4.4.3. Update next suggested bid
- 2 6. If nobody accepts the suggested bid, then
- 3 6.1. Reduce suggested next bid
- 4 6.2. If accepted, resume normal sequence
- 5 6.3. If not accepted, reduce suggested next bid
- 6 6.4. If accepted, resume normal sequence
- 7 6.5. If not, begin close
- 8 6.6. "Going once ...", if response, resume normal sequence, else
- 9 6.7. "Going twice ..." if response, resume normal sequence, else
- 10 6.8. Done. Display closing screen
- 11 7. Settle with winning bidder, two models
- 12 7.1. Connect buyer to seller for direct settlement
- 13 7.2. Collect money from buyer, deduct fee, convey amount to seller
- 14 Variant (b): batch (i.e. time limited) auction
- 15 Conventional on-line batch (time limited) auctions are common. E-bay is
- 16 the most prominent example. This process description continues from step 4 of
- 17 the English auction description as the startup of the concurrent and batch auctions
- 18 are the same.
- 19 5. Conduct auction: Until closing time for an item:
- 20 5.1. On entry to system display the following for the potential buyer:
- 21 5.1.1. Latest listing
- 22 5.1.2. Categories
- 23 5.1.3. Search screen
- 24 5.2. On selection of categories:
- 25 5.2.1. Execute dill down
- 26 5.2.2. Retrieve count of items that meet criteria
- 27 5.2.3. If more count is less than 25 (or other small number (n)
- 28 consistent with the layout of the screen) retrieve all items that meet
- 29 criterion
- 30 5.2.4. If count is more than n, retrieve n auctions with nearest
- 31 expiration time
- 32 5.2.5. Display link list to all items in list, sort order should be
- 33 auction with nearest deadline to most distant

- 1 5.2.5.1. Item name
- 2 5.2.5.2. Time till end of auction
- 3 5.2.5.3. Highest current bid
- 4 5.2.6. On user selection of the item, display same information as above plus
- 5 5.2.6.1. Description
- 6 5.2.6.2. Photo (if any)
- 7 5.2.6.3. Attachments (if any)
- 8 5.2.7. If count is more than n, display further drill-down options as
- 9 well as item information above
- 10 5.3. Accept new bid through the display screen
- 11 5.3.1. Log bids in order, reject if bid is not higher than last high bid by
- 12 increment.
- 13 5.3.2. If bid is rejected, tell bidder that their bid is not sufficient
- 14 5.3.3. Update database recording highest bid, bidder, time of bid
- 15 5.3.4. Display screen to user to confirm that their bid is the highest
- 16 6. When the time limit is reached, determine if a new bid has been received in the
- 17 last 3 minutes (or other short time period). If so, extent the bidding time by 3
- 18 minutes (or other short time period) and execute step 5 with a new closing time.
- 19 7. When the time limit is reached, including all extensions under step 6, then
- 20 7.1. Email message to highest bidder that they won
- 21 7.2. Add transaction to completed deals
- 22 7.3. Update splash and add screens
- 23 7.4. Settle with winning bidder-- two models:
- 24 7.4.1. Connect buyer to seller for direct settlement
- 25 7.4.2. Collect money from buyer, deduct fee, convey amount to seller

C. Dutch Auction Transaction Engine

- 27 A Dutch auction, like a standard auction, involves the sale of a single item or
- 28 batch with fixed specifications. There is one seller, and many potential buyers. The
- 29 seller sets the prices, ideally higher than any buyer's maximum bid price. The
- 30 offered price is reduced by a fixed increment at fixed intervals until a buyer accepts
- 31 the price. The purchase goes to the first buyer in to accept the price. In the physical
- 32 world (as opposed to the online world), Dutch auctions are rarely if ever run
- 33 concurrently. In a live trading room, it could be difficult to determine which buyers

1 was first to commit to a price when several are willing to pay the same amount. The
2 Dutch auction is relatively simple to implement in an electronic environment. There
3 are, at present, no online Dutch Auctions of which the inventors are aware.

4 1. Enter and maintain a framework for catalog

5 1.1. Enter / delete / edit categories. Categories are titles for groups of items, such
6 as "furniture" or "solvents"

7 1.2. Enter / delete / edit subcategories. Subcategories are categories within
8 categories, effectively establishing a hierarchy of products. Example:
9 furniture/dining room/tables.

10 1.3. Create groups of categories and subcategories (e.g. see also....). The
11 grouping allows a person browsing items to be referred to another category
12 that may contains items of interest. For example, someone may reach the
13 furniture/dining room/tables and then be referred to
14 furniture/office/conference room tables where other suitable tables may be
15 listed, or to furniture/dining room/chairs to buy chairs that make the table.

16 This cross referencing makes transforms the hierarchical arrangement of
17 categories into a web.

18 2. Execute qualification process (optional)

19 2.1. Admit bidders who are qualified based on past participation

20 2.2. Provide fill-in-the blank qualification form new bidders

21 2.3. Collect information

22 2.4. Conduct automated review or manual review

23 2.5. Inform prospective bidder of qualification or not

24 3. Collect information on items to be auctioned and owners, including

25 3.1. Identity of seller

26 3.2. Descriptions, optionally including attachments and photographs, independent
27 certifications or appraisals, or other information necessary to establish the
28 value of the item

29 3.3. Categorization

30 3.4. Starting price

31 3.5. Increment, Interval for reduction

32 3.6. Minimum price

33 3.7. Obtain consent to rules (possibly as part of registration/qualification process)

- 1 3.8. Collect to conduct auction if item is
- 2 3.9. Calculate time to take item off auction by determining the number of steps
- 3 (intervals) necessary to reduce price from the starting price to the
- 4 minimum
- 5 3.10. Record all of the above information in the Dutch auction database
- 6 4. Cull expired options
- 7 4.1. Search database periodically for items where current time is later than time
- 8 to take item off auction (2.9)
- 9 4.2. Inform owner that item was not sold
- 10 4.3. Delete entry from database
- 11 4.4. Prompt for revised terms start of another auction, create new entry if user
- 12 takes option
- 13 5. When the buyer enters the system display a list of high level categories, a prompt
- 14 for search criteria, and/or a link to a search page. Allow user to drill down
- 15 through categories or enter search parameters.
- 16 5.1. Retrieve count of items that meet criteria
- 17 5.2. If more count is less than 25 (or other small number (n) consistent with the
- 18 layout of the screen) retrieve all items that meet criterion
- 19 5.3. If count is more than n, retrieve n auctions with nearest expiration time
- 20 5.4. Display link list to all items in list, sort order should be auction with nearest
- 21 deadline to most distant
- 22 5.4.1. Item name
- 23 5.4.2. Time till end of auction
- 24 5.4.3. Current price:
- 25 5.4.3.1. Retrieve starting price (SP) and increment (I\$)
- 26 5.4.3.2. Calculate number of intervals since start of auction (INT)
- 27 5.4.3.3. Determine price = $SP - (INT * \$)$
- 28 5.5. On click, display same information as above plus
- 29 5.6. Description
- 30 5.7. Photo (if any)
- 31 5.8. Attachments (if any)
- 32 5.9. The display screen should include a button that allows the buyer to purchase
- 33 the item at the selected price.

- 1 6. When the user clicks the "buy" button
- 2 6.1. Email message to highest bidder that they won
- 3 6.2. Add transaction to completed deals database
- 4 6.3. Settle with winning bidder-- two models:
- 5 6.3.1. Connect buyer to seller for direct settlement
- 6 6.3.2. Collect money from buyer, deduct fee if any for auction and
- 7 payment services, convey the remainder to seller.

8 D. Reverse English Auction Transaction Engine

9 In a reverse auction, there are multiple buyers to one seller. Prices come
10 down rather than up. There are many variants of a reverse auction. The variant
11 discussed here is a reverse English auction. Reverse auctions have been
12 implemented on line in Open Markets.

13 The process for posting an item for bid and for qualifying bidders is the
14 same as for other auctions. The difference here is that the buyer may optionally
15 set a maximum price.

- 16 1. Accessing the list of items sought
- 17 Potential bidders access items sought by working through a hierarchy of
- 18 categories and subcategories or entering search criteria, as for other auctions. A
- 19 list of items within the category/subcategory and/or meeting the search criteria
- 20 is displayed. The user may then
- 21 1.1. Terminate the session on finding no suitable items
- 22 1.2. Revise the search criteria
- 23 1.3. Select an item on which to bid
- 24 2. If the user selects an item on which that may wish to bid, detailed information
- 25 about the items is displayed. This item may include the following information:
- 26 2.1. Name
- 27 2.2. Seller
- 28 2.3. Description
- 29 2.4. Detailed specifications for items
- 30 2.5. Delivery requirements
- 31 2.6. Proposed terms
- 32 2.7. Current low bid
- 33 3. If the user determines that they should bid, he accesses the bid entry screen from

- 1 the detailed description in Step 2 above. Making a bid consists of entering the
- 2 following information:
- 3 3.1. New, lower bid
- 4 3.2. Comments pertaining to any special terms, features, or conditions
- 5 3.3. Attachments containing relevant additional information and any
- 6 certifications required by the buyer
- 7 4. On receipt of bid, there are two options – either all bids are accepted, or bids are
- 8 accepted only after review of information by the buyer.
- 9 4.1. Case 1: all bids are accepted
- 10 4.1.1. New bid is checked to determine if it is lower than prior bid
- 11 4.1.2. If so, then
- 12 4.1.2.1. bidder is notified that their bid is currently the lowest
- 13 4.1.2.2. seller is notified of new low bid
- 14 4.1.2.3. bid database is updated
- 15 4.1.3. If not, then
- 16 4.1.3.1. Bidder is notified that their bid is not the lowest
- 17 4.1.3.2. Bid screen is displayed so that bidder may lower bid
- 18 4.2. Case 2: bids are accepted after review by buyer
- 19 4.2.1. Buyer is notified of bid via email or online message
- 20 4.2.2. Buyer accesses complete information on the proposed bid through the
- 21 system
- 22 4.2.3. Buyer select accept bid or reject bid.
- 23 4.2.4. If bid is accepted, then
- 24 4.2.4.1. Bidder is notified that their bid is currently the lowest
- 25 4.2.4.2. Bid database is updated
- 26 4.2.5. If bid is not accepted, then
- 27 4.2.5.1. Buyer enters reason for not accepting bid
- 28 4.2.5.2. Bidder is informed that bid is rejected with reason stated
- 29 above
- 30 4.2.5.3. Bidder may access the bid screen to revise offer
- 31 5. When time period has expired and there have been no bids within a short
- 32 specified interval, then
- 33 5.1. If at least one bid less than the maximum has been received, then:

- 1 5.1.1. Notify low bidder that their offer was successful
- 2 5.1.2. Add transaction to completed deals database
- 3 5.1.3. Settle with winning bidder-- two models:
- 4 5.1.3.1. Connect or introduce buyer to seller for direct settlement
- 5 5.1.3.2. Collect money from buyer, deduct fee if any for auction and
- 6 payment services, and convey the remainder to seller.
- 7 5.2. If no bid less than the maximum has been received, the
- 8 5.2.1. Notify buyer
- 9 5.2.2. Allow buyer to revise bid criteria

10 E. Sealed Bid Transaction Engine

11 In a sealed bid system, the buyer publishes or distributes detailed, fixed
12 specification to a number of potential bidders (who may or may not be
13 prequalified). Bidders submit binding bids by a specified deadline, in a specific
14 format that allows ready comparison. The competitive bidding process is
15 distinguished from the bid and proposal process by the complexity of the
16 specifications and the bids. In a simple competitive bid, competition among the
17 bidders is along one or two readily quantified dimensions (always including price)
18 and there is little or no room for variation in the form or specifications of the
19 offering. Comparison of the bids is elementary.

20 The process for posting an item for bid and for qualifying bidders is the
21 same as for other transactions as is the method to identify items on which to bid
22 either using the hierarchy of categories and subcategories or a search engine.

- 23 1. If the user selects an item on which he may wish to bid, detailed information
- 24 about the items is displayed. This item may include the following information:
- 25 1.1. Name
- 26 1.2. Seller
- 27 1.3. Description
- 28 1.4. Detailed specifications for items including all information necessary to
- 29 prepare a bid
- 30 1.5. Bid instruction including specification for any documentation the buyer may
- 31 required with a bid (e.g. proof of bonding or license)
- 32 1.6. Notice of any fees for bid registration
- 33 1.7. Delivery requirements

1 1.8. Proposed terms

2 2. After review of the bid requirements, the user may choose not to bid or may enter
3 a bid. The process for entering a bid consists of preparing a bid package,
4 including the price offered and any necessary supporting documentation. This
5 is done by completing an online form, with provision for attachments. The bid
6 is submitted through the system where it goes into a database of bids that are not
7 opened to the closing time for the bidding process.

8 3. At the closing time, all bid packages are conveyed to the buyer.

9 3.1. If there are no bids, the buyer is offered the opportunity to revise the request
10 for bids.

11 3.2. If there are multiple bids, the buyer reviews the bids and selects the lowest
12 priced qualifying bid. The buyer informs the seller and arranges payment
13 and delivery in accord with the terms stated in the bid package.

14 F. Order Matching Transaction Engine

15 In an order-matching system there are many potential buyers. Each posts
16 binding offer to buy (bid amount) or sell (asked amount). The process proceeds in
17 real time. The order matching system constantly compares bid and asked and, when
18 a match is found within a specified spread, the deal is concluded. No accepted offer
19 can be repudiated, but offers may be withdrawn before a deal is consummated. The
20 strike price is posted so that buyers and sellers can modify their offerings in real time.
21 The items traded are fungible so that price is the only decision. For the market to
22 operate efficiently the items traded must be tightly defined and the terms of sale must
23 be fixed and determined in advance. This is typically done by the operation of an
24 exchange, with the order-matching engine operating in the background. To insure
25 that the items traded are well defined, and the terms of sale are rigid example of an
26 order matching process in stock trading on an exchange.

27 Users of an order-matching engine are all potential buyers and seller. They
28 are qualified in advance using a process like that outlined by for auction with the
29 extension that deposit accounts are frequently required given the speed of
30 transactions in exchange environments.

31 1. Establish and maintain items to be traded. All functions in this category are
32 reserved to the manager of the exchange or a designee.

33 To add (i.e. "list" and idem), enter

- 1.1. Unique item number or symbol
- 1.2. Description of item (e.g. Sears Class A Common Stock)
- 1.3. Terms and conditions ownership (e.g. who can own) if any
- 1.4. Trading units (e.g. shares, blocks, etc.)
- 1.5. Additional information as required by the rules of the exchange
- To delete (i.e. "delist" and item)
- 1.6. Select the item to be deleted
- 1.7. Confirm deletion
2. On entry to the system, potential buyers and sellers can review the price of the last transaction of any item, either through a list or a search by item name or symbol. The current highest asked and lowest bid price are also shown.
3. An offer to sell is posted by entering the following information:
 - 3.1. Item number or symbol
 - 3.2. Quantity offered
 - 3.3. Proposed price ("asked")
 - 3.4. Seller
 - 3.5. Offers may be revise at any time prior to consummation of a deal
4. An offer to buy is posted by entering the following information
 - 4.1. Item number or symbol
 - 4.2. Quantity offered
 - 4.3. Proposed price ("asked")
 - 4.4. Buyer
 - 4.5. Offers may be revised at any time prior to consummation of a deal
5. Offers to buy and sell are constantly reviewed by the software. When there is an offer to buy and sell at a price within a preset difference. When prices match, buyers and sellers are notified of the transaction, and the transaction is recorded. The display of the last transaction price, the highest bid and the lowest asked price is updated.
6. The transaction is conveyed to the backend accounting system of the exchange.

G. Bid and Proposal

The bid and proposal process is typically used for procurement of large or complex products or services, in which cost is not the only factor. Cost must be weighed against the buyer's assessment of the quality and suitability of an offering

1 and the ability of the bidder to deliver the product or perform the specified services.
2 The bid and proposal process is conducted between one buyer (possibly
3 representing a consortium) and many potential sellers, sometimes organized into
4 teams. The buyer issues specifications that may be general or highly specific, brief
5 or very lengthy. The specifications may be distributed freely or to a list of qualified
6 buyers.

7 With physical RFPs, the size and the associated cost of distribution make it
8 common practice to advertise the availability of the RFP first, sending copies only
9 to those that request it. Frequently, the requestors are required to supply information
10 to establish their qualifications to bid. While cost is not an issue in electronic
11 dissemination of RFPs, the model of advertising prior to distribution is still useful in
12 managing the qualification process. This is addressed as variant (a) is this
13 description. Variant (b) requires no prequalification.

14 In a competitive bid on fixed requirements (sealed bid or auction), there is
15 typically very little communication between buyer and seller between publication of
16 the request and submission of the bids. The requirements are comparatively simple,
17 clear, and unambiguous. In contrast, the bid and proposal process may involve
18 considerable communication between buyer and seller. The process may begin with
19 a bidders' conference to answer questions about the requirements. Additional
20 questions from bidders may be accepted, though not all need be answered.
21 Questions and answers may be made available to all bidders or the response may be
22 in private. This dialog is crucial for two reasons. First, it helps the bidders
23 understand the requirements and to be responsive in their bids. Second, it is not
24 unusual for the bidders' questions to identify some point of ambiguity, error, or
25 contradiction in the specifications, leading to a modification of the RFP. The
26 diverse perspectives of the bidders, and the close attention required on their part to
27 prepare a bid inherently provides an excellent review of the RFP.

28 The initial phase of the RFP process concludes with submission of the bids,
29 but this is far from the conclusion of the process. Commonly, questions arise from
30 the review of the proposals. These may relate to a specific submission or have
31 broader implications, leading to modification of the requirements. The list of
32 bidders can be culled to the best candidates. These are asked to answer questions
33 about their proposals and to provide additional and clarifying information.

1 The process described here is built around the document repository described.
2 elsewhere in this application. Through this process of refinement, the list of bidders
3 is narrowed to one or two with whom a contract is negotiated. The process of
4 negotiation is addressed as a separate transaction type (Negotiation Engine) as it may
5 be conducted without the bid and proposal process.

6 Variant (A): with pre-qualification

- 7 1. Software supports the user in creating a web site for the proposal process.
8 Initially this site manages the process for requesting the request for proposal
9 (RFP), qualifying bidders, and disseminating the RFP.
- 10 2. Supported by the system software, the bidder creates and RFP advertisement by
11 2.1. entering a summary of the RFP.
12 2.2. entering a summary of the information needed to qualify as a bidder or
13 2.3. attaching a form (HTML web page or template for paper form) for entering
14 qualifying information
- 15 3. The RFP advertisement includes file transfer software for uploading qualifying
16 information to the repository.
- 17 4. Disseminate RFP advertising
18 4.1. Post on public bulletin board or
19 4.2. Disseminate via mail to selected users
- 20 5. When users access the system, issue them an encryption key and PIN to be used
21 for subsequent uploads and communications to verify their identity.
- 22 6. Receive requests for RFP in repository
23 6.1. Prompt for key
24 6.2. Encrypt submission
25 6.3. Upload
26 6.4. Generate receipt – should include an authentication number
- 27 7. Disseminate RFP to selected user, either:
28 7.1. Attach to return Email or
29 7.2. Post the RFP in a repository from which qualified prospective bidders may
30 download the file. If the repository model is used, provide notice of the
31 posting via email including any necessary PINs and codes to access the
32 repository
33 7.3. When a prospective bidder downloads an RFP, issue an encryption key to be

1 used in submitting proposal

2 8. The RFP site also includes a page through which prospective bidders can submit
3 questions. Questions and answers are posted to the site.

4 9. Updates to the schedule and amendments to the RFP are posted to the site

5 10. All access to the site is recorded to verify that prospective bidders have received
6 critical information. Direct contact may be used when it is determined that a
7 bidder had not accesses the site since critical new information was posted.

8 11. Bidders prepare their proposal and then upload them to a repository for proposals
9 using software built into the proposal site.

10 11.1. Prompt for key

11 11.2. Encrypt submission

12 11.3. Upload

13 11.4. Generate secure hash number to prevent tampering with the
14 submission

15 11.5. Generate receipt including secure hash number and authentication
16 code

17 12. After initial proposals are received, the process moves into a phase commonly
18 termed the "best and final process" in which the proposals are reviewed, the list
19 narrowed, and the proposals refined.

20 12.1. Create separate secure environment (i.e. web site with repository) for
21 each respondent

22 12.2. Exchange materials through repository (described elsewhere in this
23 filing)

24 12.3. Records and receipt each access

25 12.4. Generate key for revised proposal

26 12.5. Receive proposal using process in 11

27 12.6. Repeat from step 11 as many times as necessary

28

29 The remainder of the process is completed as a negotiated deal, described below.

30 Variant B: no pre-qualification:

31 Proceed as above, beginning with Step 6 and not requiring a key for download of the
32 RFP.

H. Negotiation Deal Engine

An engine for negotiating a deal can be built around the capability of the system to create a temporary virtual private network through the web. A temporary network is created for the negotiation. Access to the network is limited to the parties of the negotiation, their advisors and counsel, and, potentially, arbitrators and regulators. The members of the negotiating environment have access to the complete set of tools described in this filing including those for communications (email, anonymous mail, online chat, threaded dialogs, and audio and video collaboration), the library of standard contract instruments, the tools for document signature and authentication, and the document repository. Using these tools in a secure environment they can negotiate, close, and register a deal.

FIG. 19 shows one possible user interface for selecting participation engines to be made available to group members. The term "participation engine" refers generally to collaboration tools that provide features beyond merely communicating among group members. Various services such as an on-line survey tool, a DELPHI model tool; brain writing tool; and real-time polling can be provided.

A. Online Survey

In online polling or surveying, the person creating the poll uses and automated tool (new to this application) to build simultaneously an online questionnaire and a database to collect the results. The user builds the questionnaire by entering a series of questions and an associated data collection widget for each.

The polling tool builds the database and the data entry screen. The data entry screen consists of two columns. The left column is a series of questions. The right column is the data entry tool appropriate to the question. Various data entry tools can be provided to respond to the query, including such things as:

1. yes / no radio buttons
2. true / false radio buttons
3. slider with scale from 1-5, 1-10, etc.
4. fill-in-the-blank text box
5. numeric field
6. multiple check boxes (e.g. strongly disagree, disagree, agree, strongly agree)

Other data entry types may be added.

1 As each question / data collection widget is added, the polling tool creates the
2 database. The database includes one record per data collection form. Creating the
3 database structure simply means adding one new field to each record definition for
4 each question. The type of data collection widget defines the format of the field, as
5 follows:

- 6 1. yes / no radio buttons: one character field, limited to "y" or "n"
- 7 2. true / false radio buttons: one character field, limited to "y" or "n"
- 8 3. slider: real number field, with appropriate range check
- 9 4. fill-in-the-blank text box: text box
- 10 5. numeric field: real number or integer
- 11 6. multiple check boxes: integer field with range check from 1 to number of
12 boxes

13 Every data entry screen provides a "save" and "cancel" button. Save writes to the
14 database. Cancel exits the entry screen without saving.

15 The survey, once composed as described above exists as a web page. This
16 page can be embedded in web applications. It can be made available on a site
17 available to the entire Internet, on an Intranet, or in a dynamically created
18 environment. Alternatively, it can be distributed via e-mail. When the form is
19 completed, the submit button transmits the value entered to the database that is
20 created at the time the form is generated. Access to the database is controlled by the
21 rules of the database system. It may be limited to the individual who creates the
22 survey form and database, but it may be accessible other users in the survey
23 developers organization, as determined by the database administrator. Distribution
24 of the result of the analysis is at the discretion and control of the individual managing
25 the survey. This manager may be the individual who creates the survey, but the
26 actual creator may be acting on behalf of the survey manager. Results may be kept
27 private, posted to the Internet, and intranet, or a collaborative environment,
28 distributed via e-mail within an organization, or, if the information is available, sent
29 via e-mail to the participants in the survey.

30 B. Online Delphi Engine

31 The online Delphi engine allows real-time collaboration in estimating or
32 predicting an outcome that can be expressed numerically. For example, the method
33 can be used to develop a consensus forecast of grain prices. The method has been

- 1 in used since the 1970s, but has not previously been adapted to online processes.
- 2 One possible method is as follows:
- 3 1. Establish the session
- 4 1.1. Within an online community, the moderator of the session creates the brain
- 5 writing session by entering the following information:
- 6 1.1.1. Name of moderator
- 7 1.1.2. Title of the session
- 8 1.1.3. Description of the session
- 9 1.1.4. Background reading as references or attachments
- 10 1.1.5. Start date for the session
- 11 1.1.6. Scheduled end for the session
- 12 1.1.7. Access to the session:
- 13 1.1.7.1. URL for access
- 14 1.1.7.2. Open to all or invitees only for observation
- 15 1.1.7.3. Open to all or invitees only for participation
- 16 1.1.8. Payment information if required
- 17 2. Optionally, the session may be advertised on line
- 18 3. If the session is private, invitations with logon keys must be distributed via email,
- 19 actual mail, or download.
- 20 4. Optionally, the moderator may run on online applications and qualification
- 21 process
- 22 5. Prior to the start of the session, the moderator must describe precisely the value
- 23 to be estimated. The definition must be completely unambiguous.
- 24 6. Each participant connects at the start of the session. On connecting, they question
- 25 is posed (e.g. "What will be the price of West Texas intermediate oil in
- 26 December?")
- 27 7. Each participant enters a number a brief (1 paragraph maximum) explanation of
- 28 their reasoning.
- 29 8. When the participant is done entering their estimate, they click "Done".
- 30 9. Each participant's estimate and explanation is recorded.
- 31 10. Each participant then sees the summary screen.

- 1 11. Estimates are arrayed graphically from top to bottom of the screen, from lowest
2 to highest. The value is stated as is the associated comment, but the source of
3 the comment is not revealed.
- 4 12. Participants can review the estimates and comments, send an anonymous message
5 to the author or any comment, or amend their answers.
- 6 13. The session terminates when the time expires, or when the moderator determines
7 that there it is no longer appropriate to continue. The operator may determine
8 this is based on declining participation or, if participation is high, the moderator
9 may extend the deadline.
- 10 14. Participants and observers may access the final display of estimates, again
11 arrayed from top to bottom, lowest to highest.

12 C. Brain Writing

13 Brain writing is a variant of a method for facilitated group discussion termed
14 brainstorming. The objective of brainstorming is to maintain the focus of the
15 discussion while encouraging creative input and recognizing the contributions of all
16 members of the group. It seeks to avoid problems with a few individuals dominating
17 the discussion, with junior staff deferring to senior staff, and with new ideas being
18 abandoned before than can be developed fully. Brain storming has been commonly
19 used since the late 1960s. Brain writing is a more intense method that relies on joint
20 writing rather than discussion. What is presented here is adaptation of that method
21 to an online environment. It is believed to be the first such adaptation.

- 22 1. Establish the session
- 23 1.1. Within an online community, the moderator of the session creates the brain
24 writing session by entering the following information:
- 25 1.1.1. Name of moderator
- 26 1.1.2. Title of the session
- 27 1.1.3. Description of the session
- 28 1.1.4. Background reading as references or attachments
- 29 1.1.5. Start date for the session
- 30 1.1.6. Scheduled end for the session
- 31 1.1.7. Access to the session:
- 32 1.1.7.1. URL for access
- 33 1.1.7.2. Open to all or invitees only for observation

- 1.1.7.3. Open to all or invitees only for participation
- 1.1.8. Payment information if required
2. Optionally, the session may be advertised on line
3. If the session is private, invitations with logon keys must be distributed via email, actual mail, or download.
4. Optionally, the moderator may run on online applications and qualification process
5. Prior to the start of the session, the moderator must list some number (typically 5-10) of questions or hypotheses to be explored. (e.g. "Our company should create a spinoff to develop and commercialize the new breast cancer vaccine") This may be done by the moderator alone, in consultation with the participants, or with other outside the session.
6. Each question or hypothesis becomes a "Card".
7. Participants may enter the session any time after the start. A password may be required if the session is not open.
8. On entry into the system, a user is given a card at random. The card consists of the initial question or hypothesis plus all comments entered on the card by other participants.
9. After reviewing the card, the participant may add his or her own comments to the bottom. After entering comments, the participant clicks "Done" to return the card to the pile.
10. When a participant returns a card to the pile, they received another card, chosen at random (preferably) or selected by the user. This process continues until the participant opts to exit. They may reenter at any time up to the conclusion of the session.
11. When a card is returned to the pile, it becomes available for assignment to the next participant. The card includes the additions of the most recent participant.
12. A participant may opt to return the card without addition if he or she has nothing to add.
13. Participants may create new cards when new ideas come to mind. These are treated in exactly the same way as original cards.
14. Observers may view any card but may not add to them.
15. The moderator may limit participation to a set number at any time so that there is a sufficient number of cards to keep the participants fully occupied.

1 16. The session terminates when the time expires, or when the moderator determines
2 that there it is no longer appropriate to continue. The operator can determine this
3 based on declining participation or, if participation is high, the moderator may
4 extend the deadline.

5 17. The raw cards are distributed at the conclusion to all participants. The moderator
6 or another individual is charged preparing a summary and arranging follow-up.

7 FIG. 22 shows one possible scheme for storing brain card writing data
8 elements. In accordance with one embodiment, each brain writing card comprises
9 a data structure including the following elements:

- 10 1. Brain writing session number: Serially assigned number to differentiate
11 brainwriting sessions. A session is the set of all cards pertaining to a
12 particular topic.
- 13 2. Card number: A Serially assigned sequence number
- 14 3. Initial Comment : The question or comment used to initiate the discussion
15 (e.g. "SAIC should purchase a company that produces Internet server
16 software")
- 17 4. Date and time card started
- 18 5. Date and time card closed
- 19 6. Comments: A collection (i.e. a set of unlimited length) containing the
20 comments added by participants in the brainwriting session.
- 21 7. Date of additional comment: Date and time that each additional comment
22 was added.
- 23 8. Commenter: Name or user ID of the person adding each additional
24 comment. Ideally, brainwriting should be anonymous to encourage open
25 dialog. Accordingly, this field may be omitted from an implementation.
26 Some organizations, however, may wish to track this information
27 without making it visible to users, or in some cases to attribute comments.

28 When the user has finished defining the group and specifying its functions,
29 environment generator 1201a (FIG. 12) creates an environment accessible to the
30 group members and including the functions specified during the environment
31 definition process. As shown in FIG. 20A, for example, a web page can be created
32 for the newly created environment, including those functions that were selected by
33 the user that created the group. All group members are notified of the existence and

1 location of the environment, and each group member can use the functions provided
2 in the environment to collaborate on a project or conduct business.

3 FIG. 20B shows what an environment might look like to a group member
4 after entering the environment. As shown in FIG. 20B, for example, a news banner
5 announces the latest news for the group. Additionally, specific communication tools,
6 research tools, transaction engines, and participation engines are made available to
7 group members, which can be executed by appropriate mouse clicks in accordance
8 with the inventive principles. According to various inventive principles, each tool
9 shown on the web page is accessible through a hyperlink to a web-based program that
10 performs predefined functions as set forth above. For example, clicking on "online
11 catalog" would link the group member to a web page that implements an online
12 ordering engine as described previously. Users can navigate through the various
13 tools using conventional web browser features (i.e., forward, backward, etc.). It may
14 be desirable to implement some or all of such software using server-side scripting or
15 other similar means consistent with the system configuration of FIG. 12.

16 FIG. 21 shows how environment generator 1201a can create multiple
17 environments including virtual private facilities, which can be implemented through
18 web pages that contain hyperlinks to functions available to members of each group
19 or environment. An environment definition software component 2106 implements
20 steps 1101 through 1103 of FIG. 11 in order to create one or more environments
21 2107. (In one embodiment, each group can also be provided with a copy of an
22 environment generator 2106 in order to create sub-groups that draw on the
23 applications and directory structure created for the group). As a user identifies group
24 members and selects functions to be provided for the environment in which the group
25 will collaborate, environment definition component 2106 stores information relating
26 to the selected members and functions in databases. Each environment can include
27 a web page (not shown in FIG. 21) and directories, tools and other applications
28 specific for each created group.

29 Based on user selections of the type illustrated in FIGS. 13 through 19,
30 environment generator 2106 creates an environment 2107 containing one or more
31 web pages with links to the selected tools. Environment generator 2106 retrieves
32 information from various information sources including a directory of
33 communication tools 2101 (e.g., including descriptions of tools and URL/IP

- 1 addresses of web applications to set up each communication tool); directory of
- 2 transaction engines 2102 (e.g., including descriptions of transaction engines and the
- 3 URL/IP addresses of web-based applications to set up each transaction engine);
- 4 directory of research tools 2103 (similar to above); list of global data objects 2104
- 5 (e.g., a dictionary of data elements from which the directory of each group can be
- 6 composed); and a directory of applications 2105 (e.g., a description of available
- 7 applications and URL/IP addresses of pages to set up access to applications).

1 **WE CLAIM:**

2 1. A method of negotiating a deal over a network of computers, the network
3 including at least one or more computers connected to the Internet, the method
4 comprising the steps of:

5 (1) posting, on an electronic list that can be viewed over the Internet,
6 information regarding one or more offers to form a contract;

7 (2) posting on the electronic list one or more responses to the one or more
8 offers;

9 (3) researching the one or more responses to determine whether they satisfy
10 one or more contract criteria;

11 (4) negotiating over the network between at least two parties to accept or
12 modify one or more of the responses; and

13 (5) electronically signing a document to consummate the contract.

14 2. The method of claim 1, wherein step (1) comprises the step of displaying
15 offers and responses in a parent-daughter spatial relationship on a computer display.

16 3. The method of claim 1, further comprising the step of sorting the one or
17 more offers and one or more responses according to a user-selected sort order.

18 4. The method of claim 1, wherein steps (1) and (2) are done anonymously,
19 such that each party to the contract cannot determine the identity of the other party
20 to the contract.

21 5. The method of claim 4, further comprising the step of simultaneous
22 revealing the identity of each party prior to step (5).

23 6. The method of claim 4, wherein steps (1) and (4) comprise the step of
24 sharing a single anonymous e-mail alias among a plurality of users.

25 7. The method of claim 1, further comprising the steps of:

26 (6) registering keywords with an electronic agent that monitors the one or
27 more offers and providing an e-mail address to be notified upon a keyword match;
28 and

29 (7) in response to the electronic agent detecting the keyword match,
30 transmitting a message to the e-mail address provided in step (6).

31 8. The method of claim 1, wherein step (2) comprises the step of clicking on
32 a hyperlink linking the information posted in step (1) to a reply card.

33 9. The method of claim 7, wherein step (2) comprises the step of requiring

1 the submission of certain information before the reply card will be accepted.

2 10. The method of claim 1, wherein steps (3) and (4) are performed a
3 plurality of times for a single contract, such that modifications are made to the one
4 or more responses.

5 11. The method of claim 1, further comprising the step of electronically
6 registering a plurality of entities that have signatory authority and correlating the
7 registered entities with one or more documents to which signatures can be affixed.

8 12. A method of displaying information on a computer display,
9 comprising the steps of:

10 (1) displaying a first plurality of graphical objects each having a shape of a
11 file folder comprising a folder face and a labeled tab, wherein the first plurality of
12 graphical objects are stacked in a cascading arrangement; and

13 (2) in response to user activation of a "flip" tab, changing the graphical
14 objects displayed in step (1) to show a second plurality of graphical objects each
15 having a shape of a file folder comprising a folder face and a labeled tab,

16 wherein each of the first and second plurality of graphical objects can be
17 brought to a foreground position in front of other graphical objects by clicking on
18 a corresponding labeled tab.

19 13. The method of claim 12, wherein each of the first and second plurality
20 of graphical objects has associated therewith one or more functions displayed on
21 the folder face thereof, wherein user can activate the one or more functions by
22 clicking thereon.

23 14. A method of creating a user-defined networked environment across a
24 plurality of computers without requiring system administrator-level privileges,
25 comprising the steps of:

26 (1) creating a group by providing a group identifier, a group description,
27 and by specifying a plurality of group members entitled to use the user-defined
28 networked environment;

29 (2) selecting a plurality of web-based communication, collaboration, and
30 transaction tools from a list of available tools, wherein the selected tools are to be
31 made available to the plurality of group members specified in claim 1; and

32 (3) through the use of computer software, automatically creating the user-
33 defined networked environment by creating a web page accessible to the plurality

1 of group members selected in step (1), wherein the web page provides access to
2 the plurality of tools selected in step (2).

3 15. The method of claim 14, wherein step (1) comprises the step of
4 inviting a plurality of individuals to join the group by transmitting an invitation to
5 prospective group members.

6 16. The method of claim 14, wherein step (1) comprises the step of
7 advertising an invitation to join the group by posting an advertisement for
8 prospective group members, wherein at least some of the prospective group
9 members are unknown to the user creating the networked environment.

10 17. The method of claim 14, further comprising the step of screening
11 prospective members that respond to the advertisement in order to determine
12 whether they should be added to the group.

13 18. The method of claim 14, further comprising the steps of electronically
14 collaborating among group members using the user-defined networked
15 environment.

16 19. The method of claim 14, further comprising the step of destroying the
17 user-defined networked environment when it is no longer needed.

18 20. The method of claim 14, wherein step (2) comprises the step of
19 selecting a transaction engine that implements an auction to members of the
20 group.

21 21. The method of claim 14, wherein step (2) comprises the step of
22 selecting a transaction engine that implements an on-line electronic survey
23 comprising survey questions that are to be answered electronically by survey
24 participants.

25 22. The method of claim 14, wherein step (2) comprises the step of
26 selecting a transaction engine that implements a bid-and-proposal tool that permits
27 group members to electronically submit bids on one or more proposals.

28 23. The method of claim 14, wherein step (2) comprises the step of
29 selecting an online ordering engine that permits group members to electronically
30 order goods or services in the user-defined networked environment.

31 24. The method of claim 14, wherein step (2) comprises the step of
32 selecting an Electronic Data Interchange (EDI) compatible interface that executes
33 electronic commercial transactions between two or more group members.

1 25. The method of claim 14, wherein step (2) comprises the step of a
2 selecting an electronic brain-writing tool that permits participants to brainstorm
3 using electronic idea cards.

4 26. A system for implementing a user-defined networked environment
5 that can be created without the need for system administrator-level privileges,
6 comprising:

7 a plurality of networked computers that communicate using Internet
8 Protocol;

9 a plurality of web browsers executing on the plurality of networked
10 computers;

11 a database that stores information concerning the user-defined networked
12 environment; and

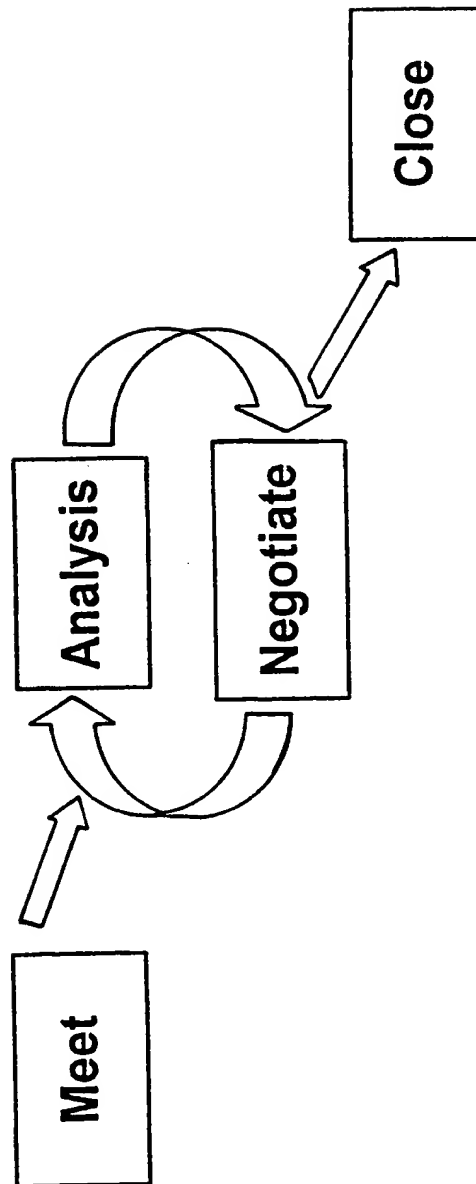
13 a computer program executing on one or more of the plurality of
14 networked computers, wherein the computer program performs the steps of:

15 (1) permitting a user to create a group comprising a plurality of group
16 members;

17 (2) permitting the user to select a plurality of web-based communication,
18 collaboration, and transaction tools from a list of available tools, wherein the
19 selected tools are to be made available to the plurality of group members; and

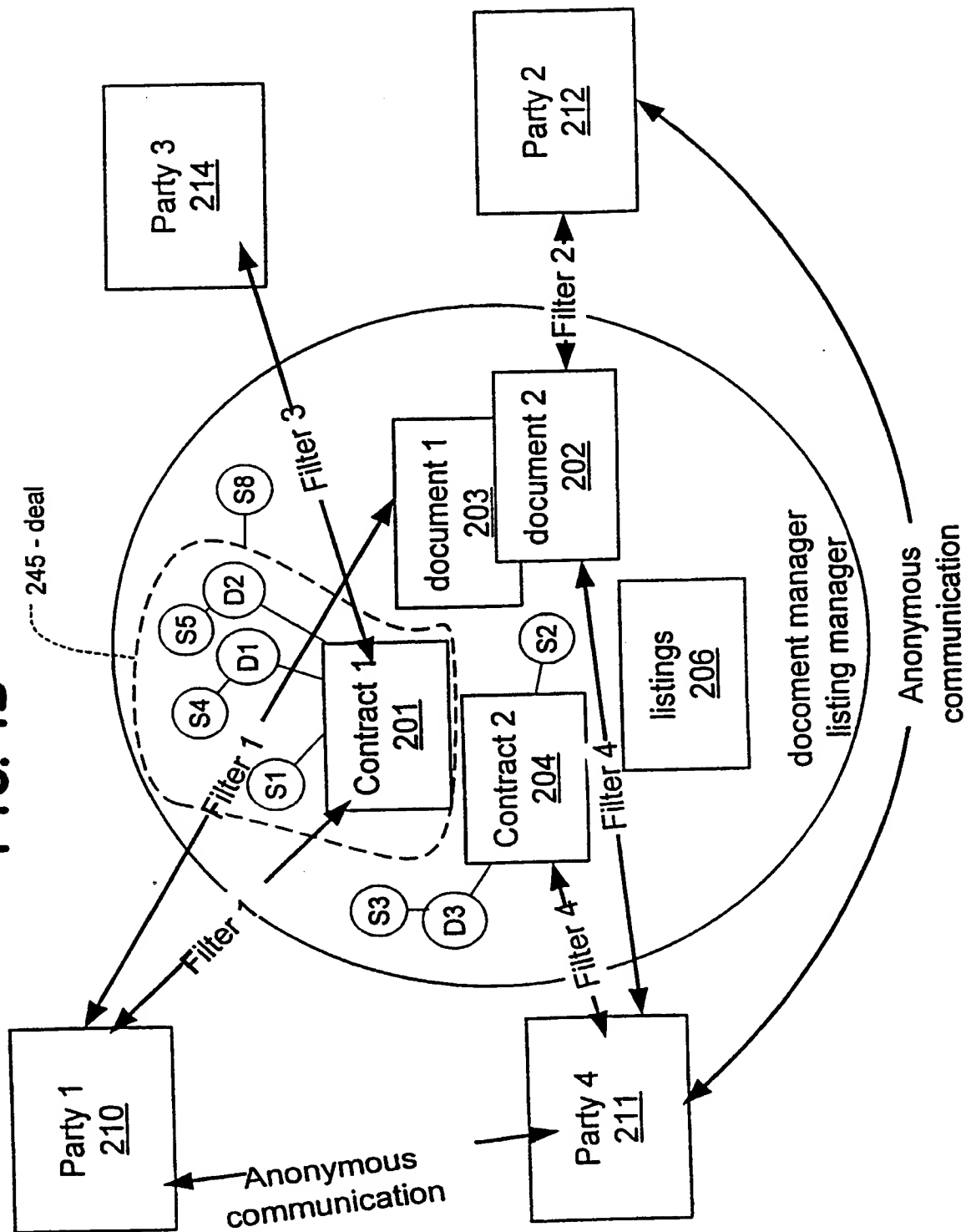
20 (3) automatically generating a web page accessible to the plurality of
21 group members, wherein the web page provides access to the plurality of tools
22 selected in step (2) to the plurality of group members.

FIG. 1A



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FIG. 1B



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FIG. 2

Number	Date	Market	Action	Title
<u>123</u>	7/10/87	Steel	Buy	Title
<u>234</u>	7/12/87	Alum.	Sell	Title
<u>236</u>	7/12/87			Title
<u>239</u>	7/10/88	Gold	Action	Title
<u>240</u>	8/12/87	Flood	Action	Title
<u>243</u>	9/01/87		Action	Title

FIG. 3

#
Date
Title
Market
Action
Description

Attachment 1

Attachment 2

Attachment 3

Instructions for responding

Reply

301

304

302

303

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FIG. 4

← → ↶ ↷ ⊗ ⊕ 🏠 🔍 📅 🕒 🔧 📄 🖨 🔗

Reply to Listing 145: Request for Bid on School Construction

Name of Company

Address

D&B Number

References for Construction Work in Fairfax County

Do you qualify as a:

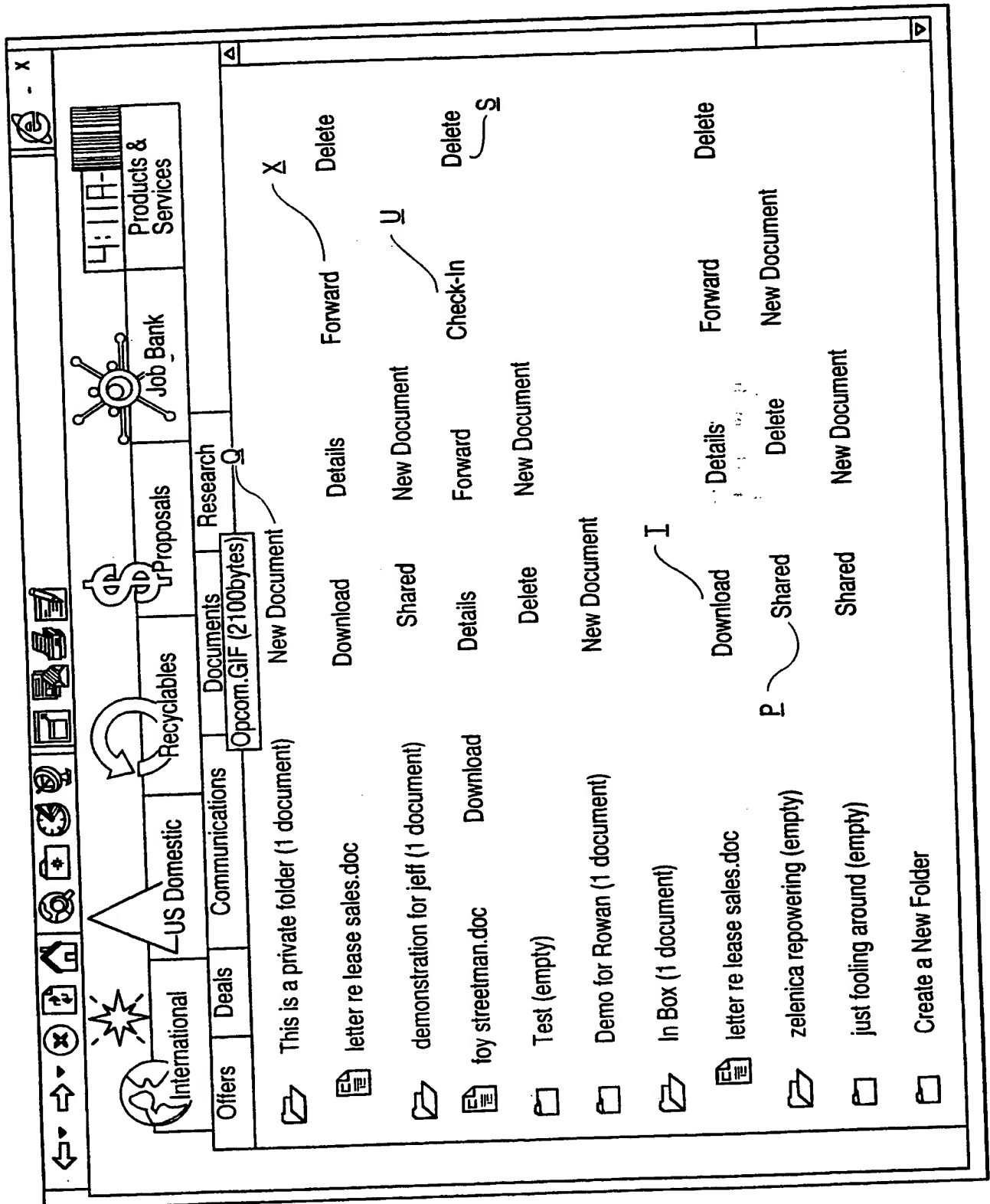
☐ Small Business

☐ Minority owned business

☐ Woman owned business

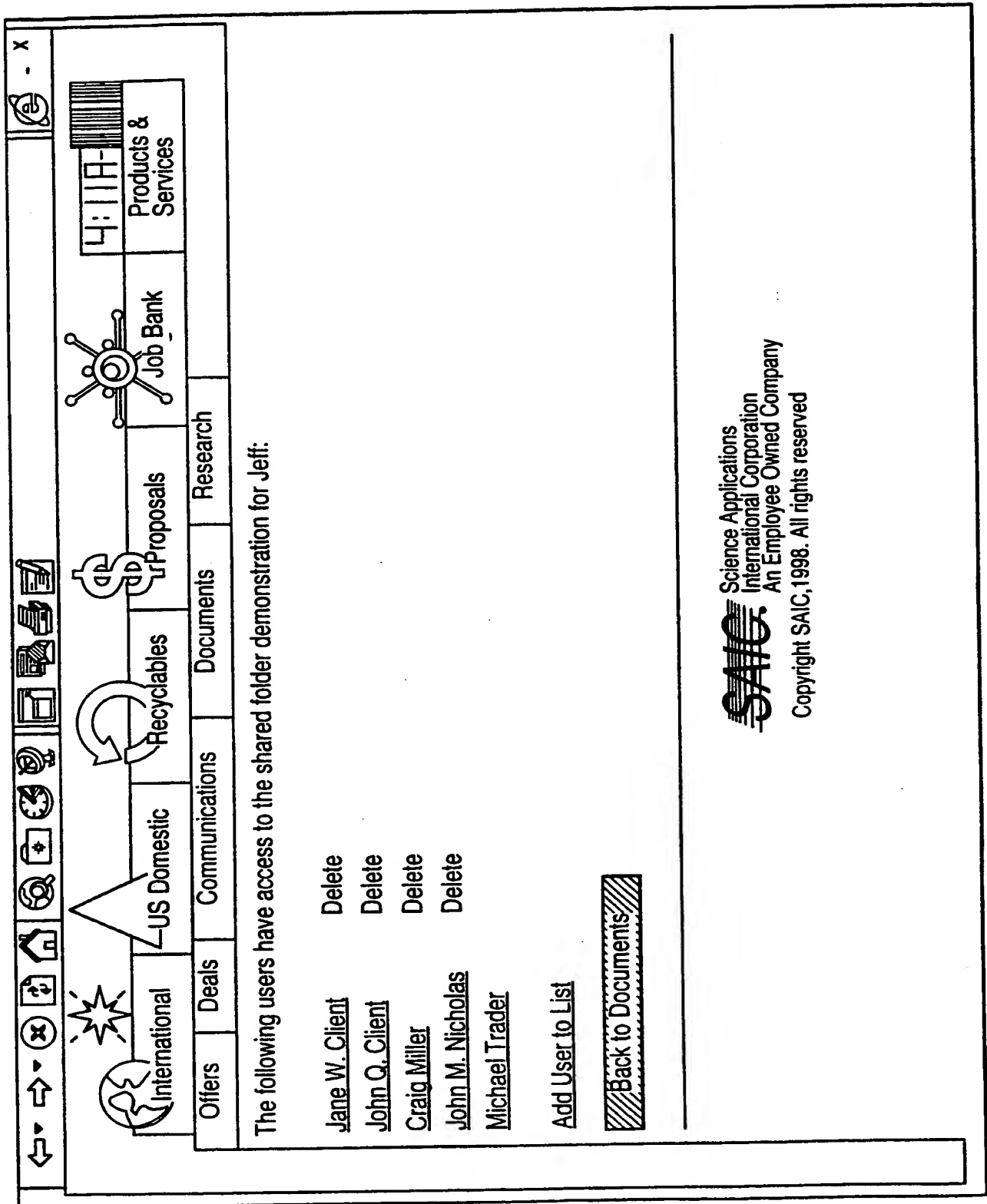
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FIG. 5



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FIG. 6



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FIG. 7

Trade Number	Date Created	Trade Title
<u>357</u>	Sep 22 1998	mmmmmmmmmm
<u>356</u>	Sep 22 1998	World Trade Center
<u>353</u>	Sep 22 1998	Florida Windstorm Coverage
<u>352</u>	Sep 22 1998	www
<u>342</u>	Sep 1 1998	Bigger deal
<u>341</u>	Sep 1 1998	big deal
<u>330</u>	Aug 18 1998	Another trade
<u>297</u>	Jun 23 1998	xgssgs
<u>295</u>	Jun 23 1998	lkjdalskj
<u>293</u>	Jun 23 1998	Test again
<u>292</u>	Jun 23 1998	Test of compiled tm
<u>6</u>	Feb 11 1998	Get in shape
<u>5</u>	Feb 10 1998	Big Deal
<u>4</u>	Feb 8 1998	Master Contract

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FIG. 8A

										Job Bank									
Recyclables										Proposals									
US Domestic										Documents									
Offers										Deals									
Close										Communications									
Research																			

Trade Number:	1
Title:	test trade
Registering Party:	John M. Nichols
Market:	steel
Deal Summary:	lkjlkj
MOU:	mou from hell
Contract:	1 Advanwin.cfg

Subscriber	Organization	Sign Date
John M. Nicholas	ABC Power Co.	9/8/98 8:56:21 PM
Michael Trader	DEF Environmental Services	9/16/98 3:19:16 PM

Authorization:

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FIG. 8B

Specify Title, Rate Summary, Deal Summary, Slip Sheet, Exhibits, and Authorizing Parties

Title:

Rate Summary:

Deal Summary:

Slip Sheet:

Add Exhibit:

Description:

Add Exhibit:

Description:

Specify Parties who will Authorize the Deal

Company:

Company Alpha

Company Beta

Company Gamma

Names:

John Q. Client

Craig Miller

Authorizing Parties:

None : None

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FIG. 9

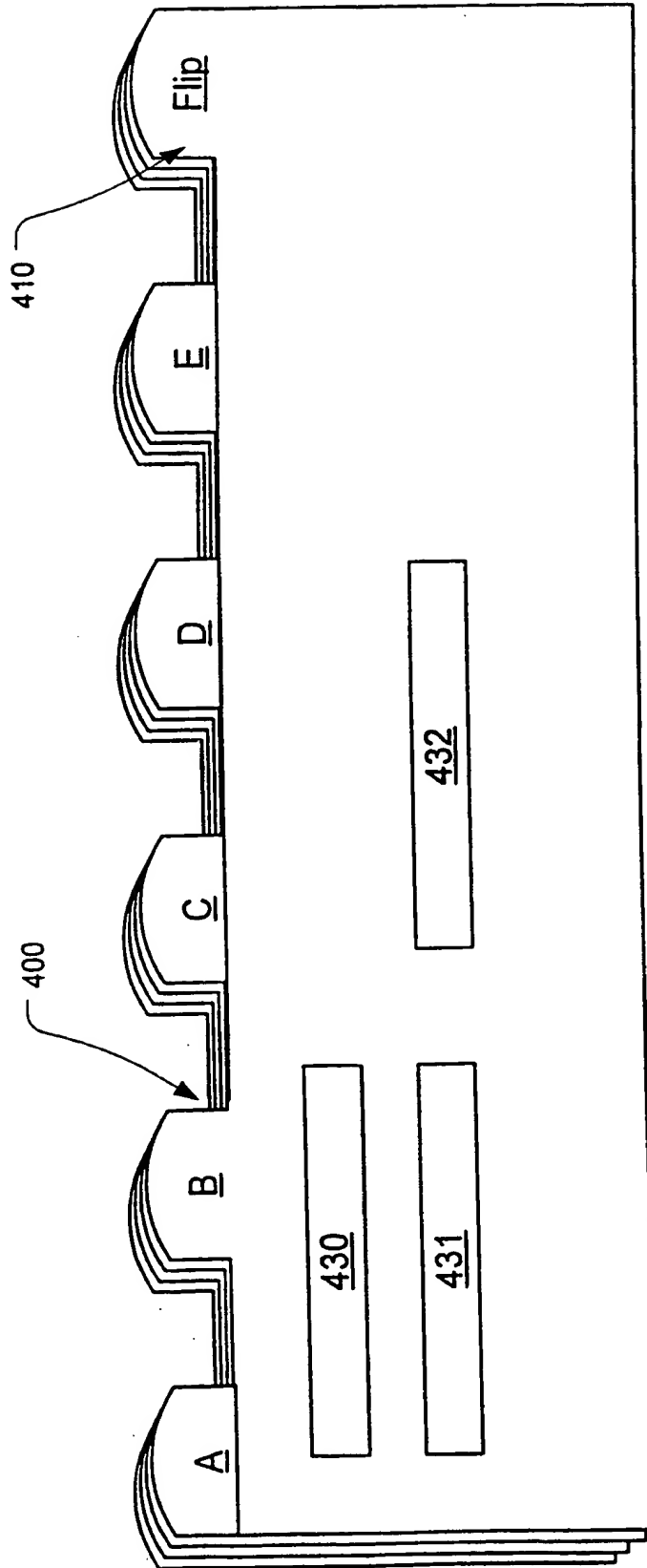


FIG. 9A

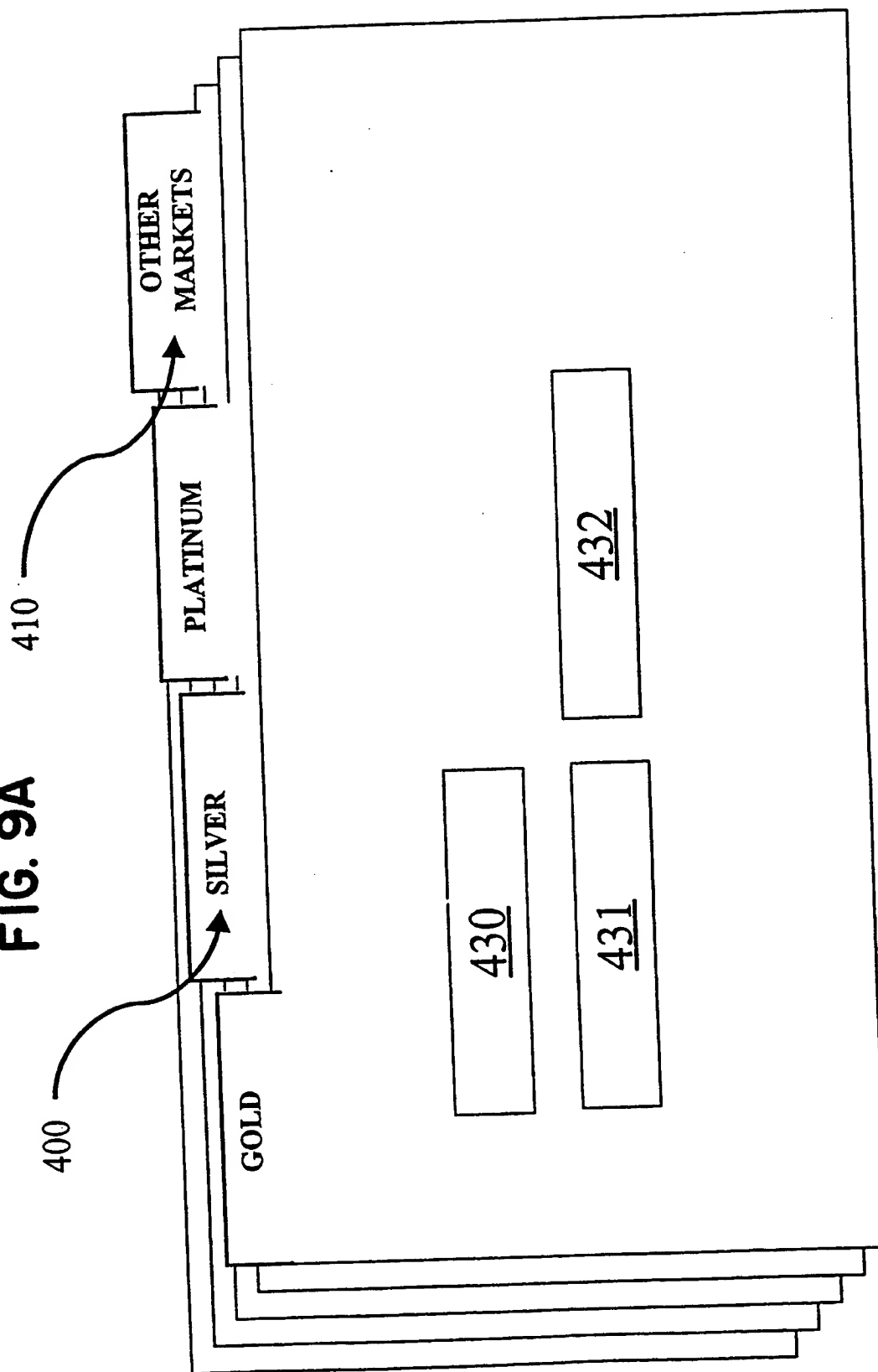


FIG. 10

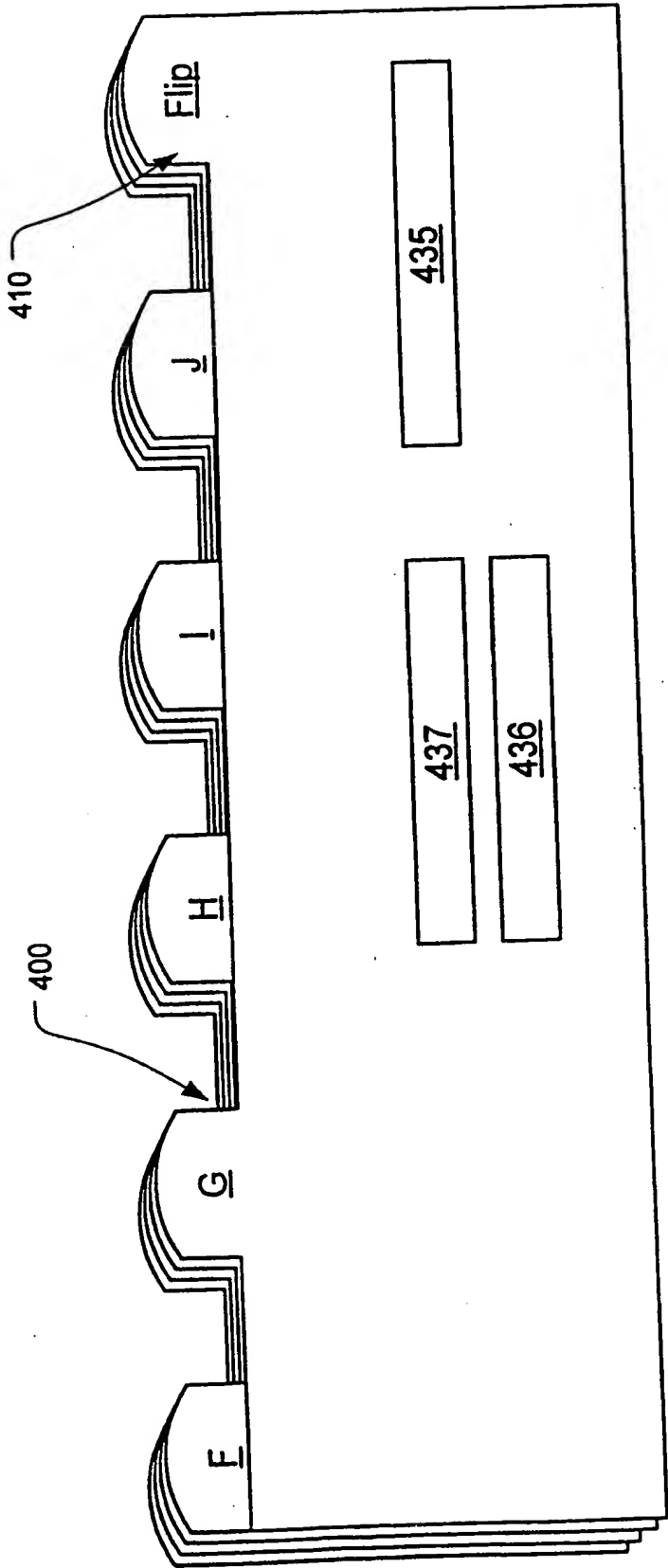
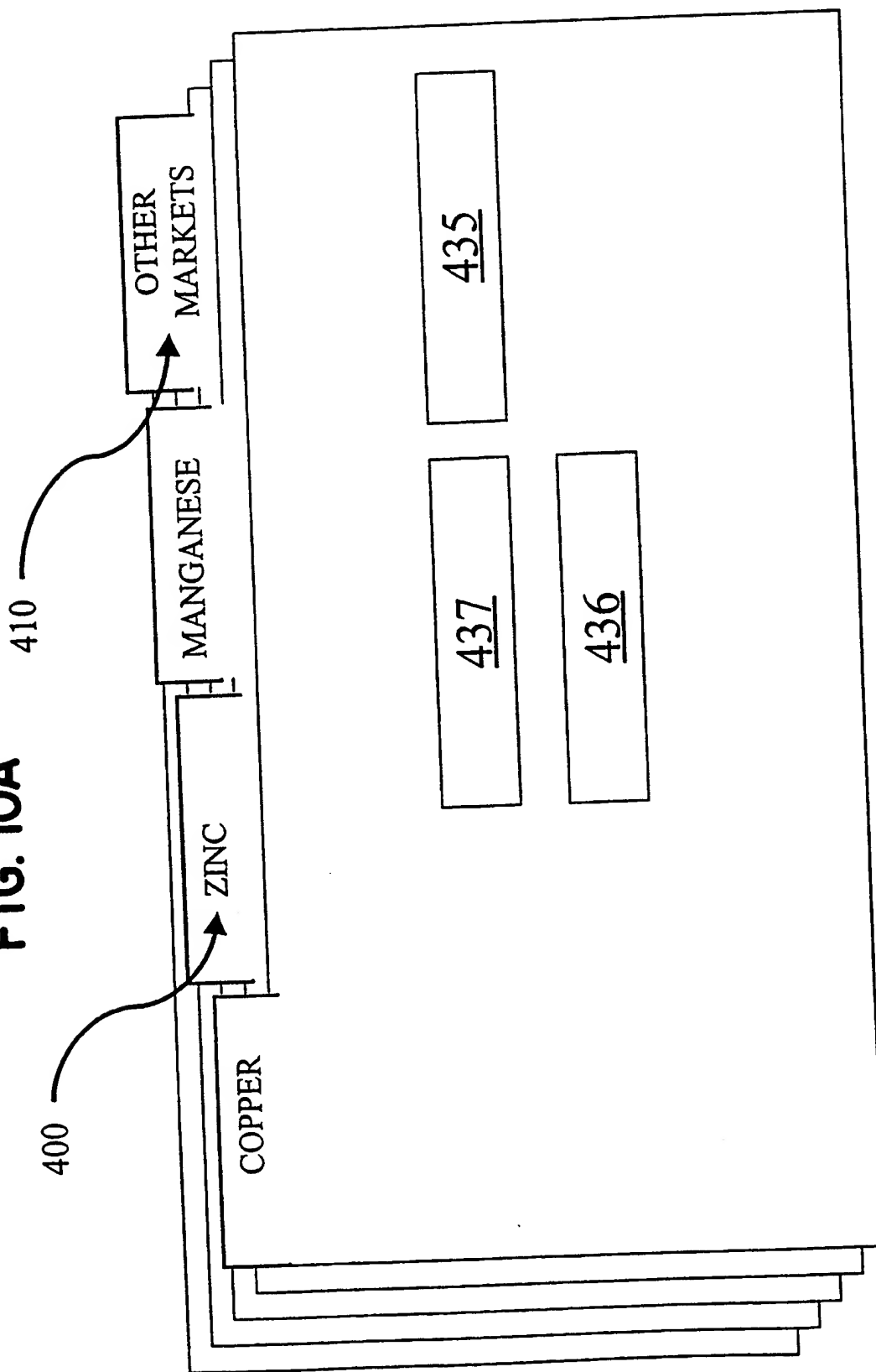


FIG. 10A



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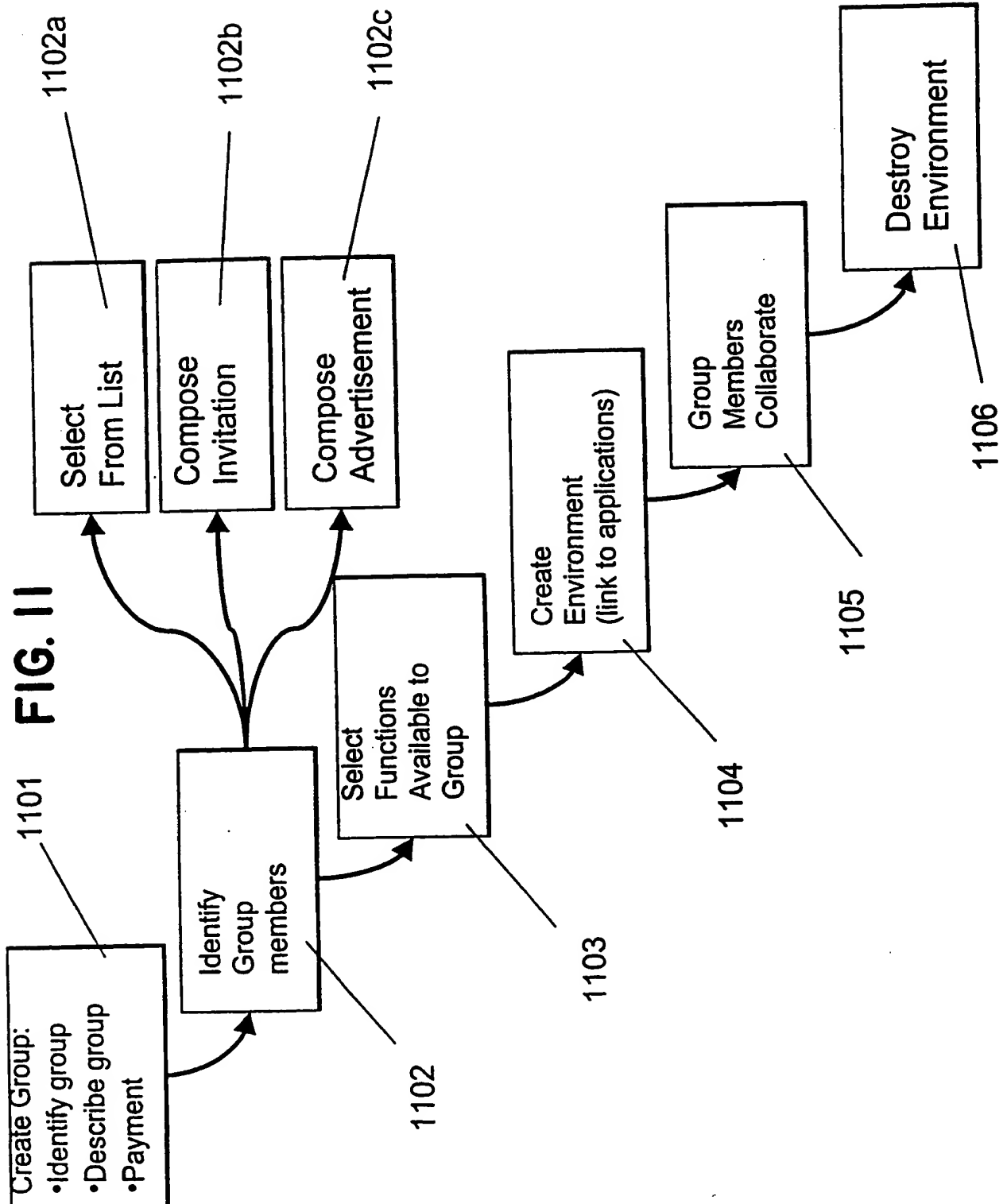
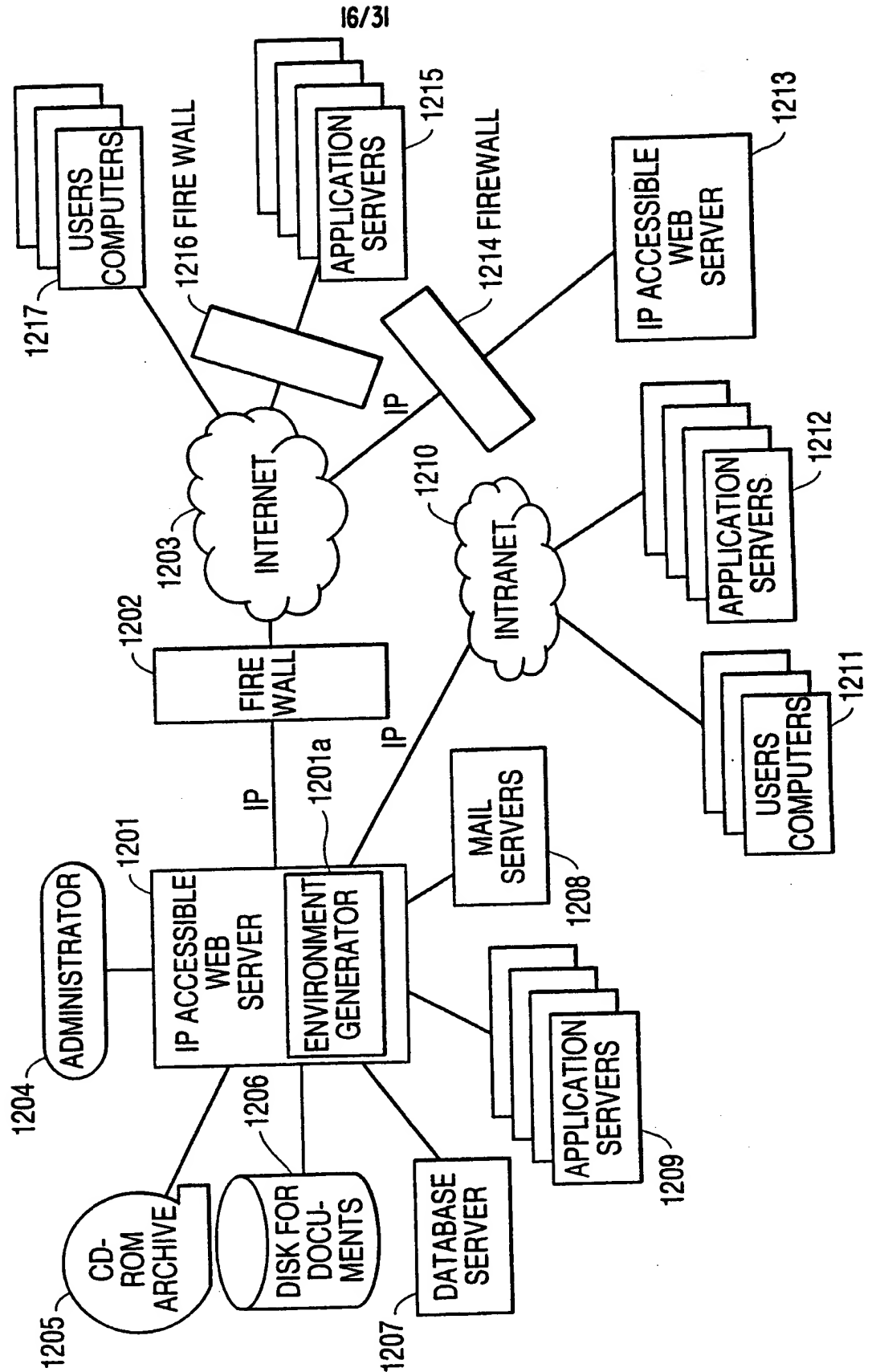


FIG. 12



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FIG. 13A

The screenshot shows a Microsoft Internet Explorer window titled "CREATE NEW ENVIRONMENT - Microsoft Internet Explorer". The address bar displays "C:\WINDOWS\DESKTOP\Figure 13(a).htm". The menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar contains icons for Back, Forward, Stop, Refresh, Home, Search, Favorites, History, Mail, and Print. The main content area displays the text "CREATE NEW ENVIRONMENT" followed by two input fields: "User Name:" with the value "JoeUser" and "Password:" with the value "SloppyJoe". A "Next" button is located below the password field. The status bar at the bottom shows "Done" and "My Computer".

CREATE NEW ENVIRONMENT - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print

Address C:\WINDOWS\DESKTOP\Figure 13(a).htm Go Links

CREATE NEW ENVIRONMENT

User Name: JoeUser

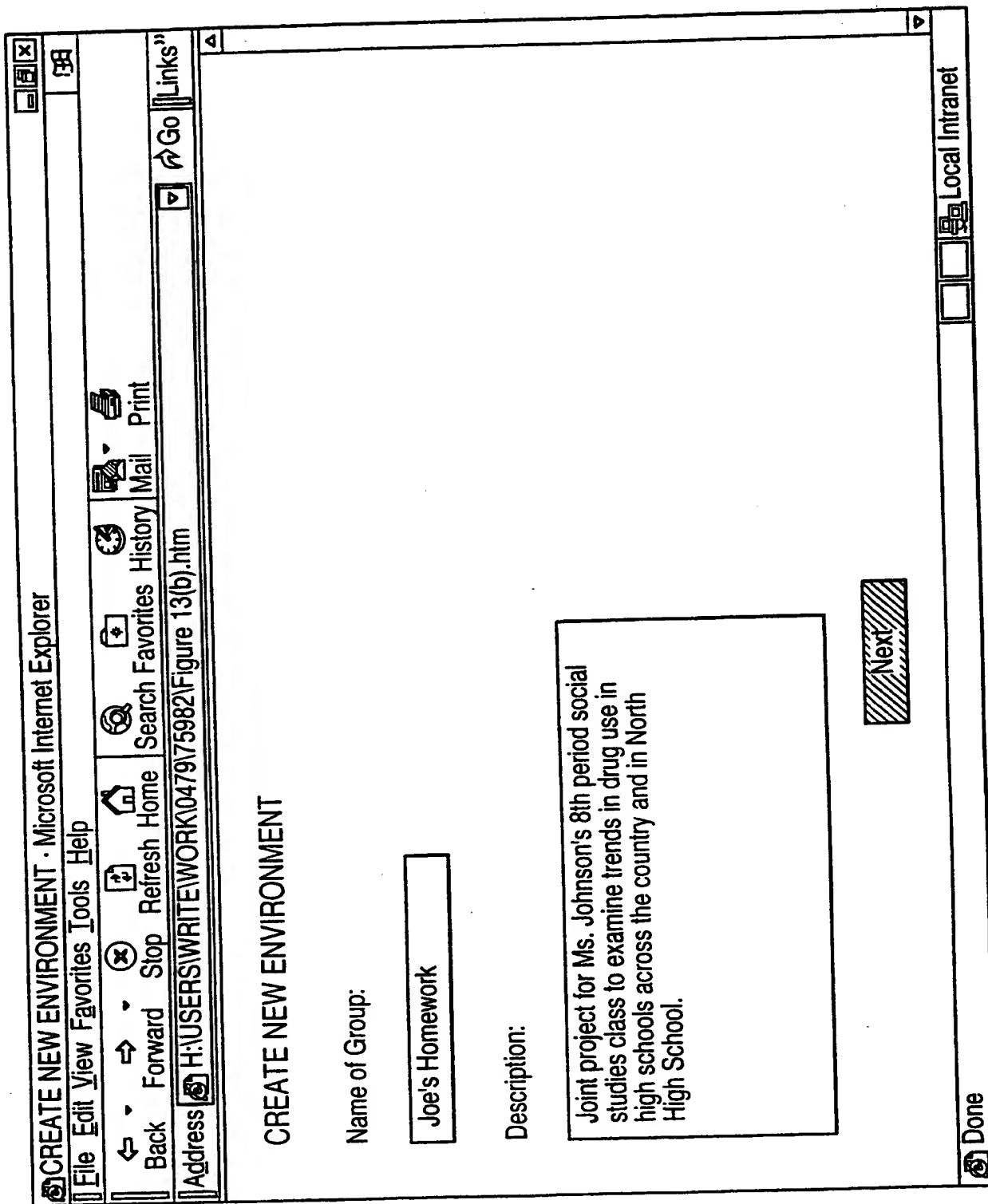
Password: SloppyJoe

Next

Done My Computer

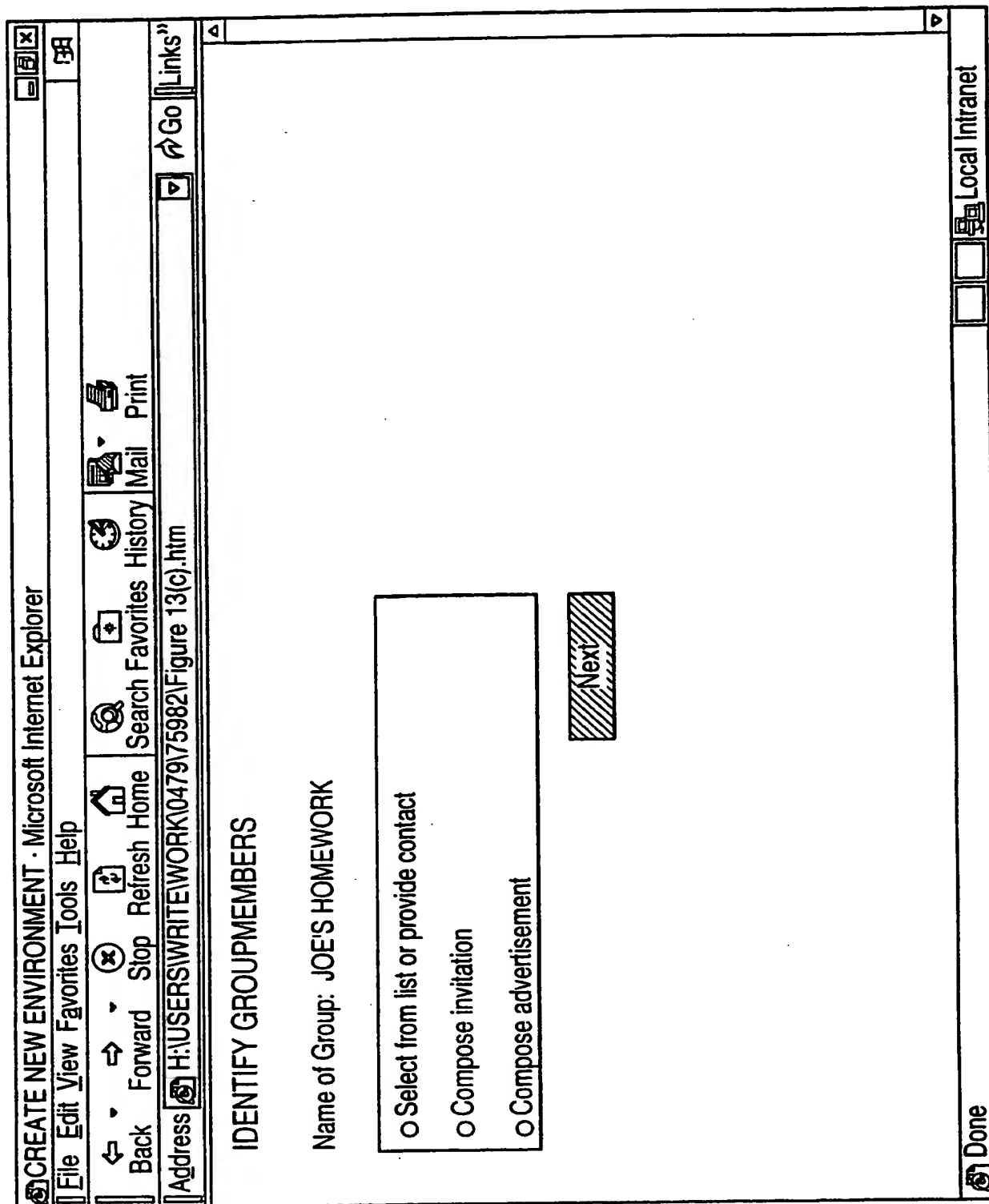
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FIG. 13B



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FIG. 13C



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FIG. 14A

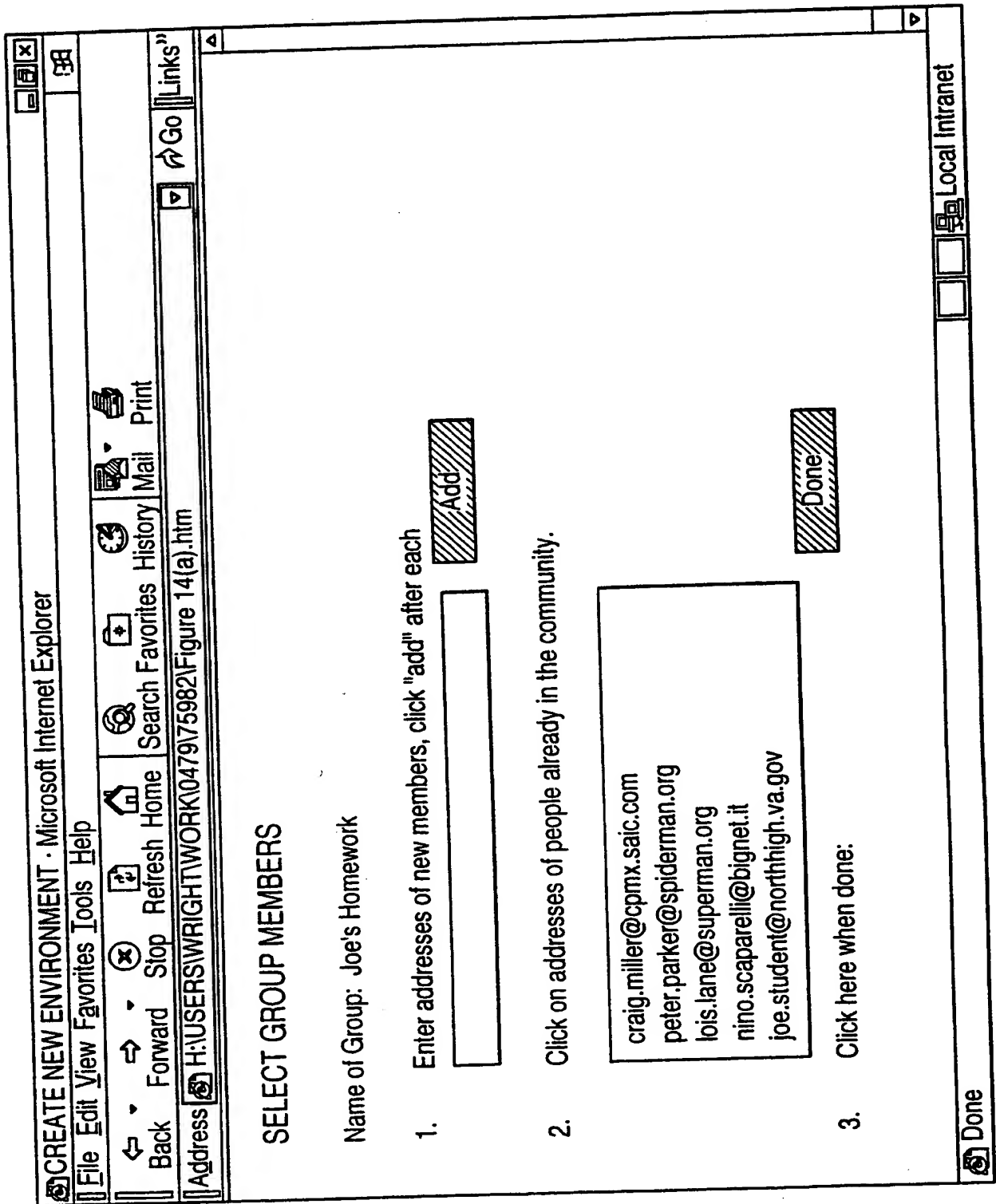


FIG. 14B

CREATE NEW ENVIRONMENT · Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print

Address H:\USERS\WRIGHT\WORK\0479\75982\Figure 14(b).htm

Go Links

INVITE GROUP MEMBERS

INVITE GROUP MEMBERS

1. Enter address:

2. Expiration data for invitation:

3. Invitation Message:

You are invited to join our group project on drug use in high schools. I think we have a good team.

4. Click to send invitation & invite next member:

5. Click when done:

Done Local Intranet

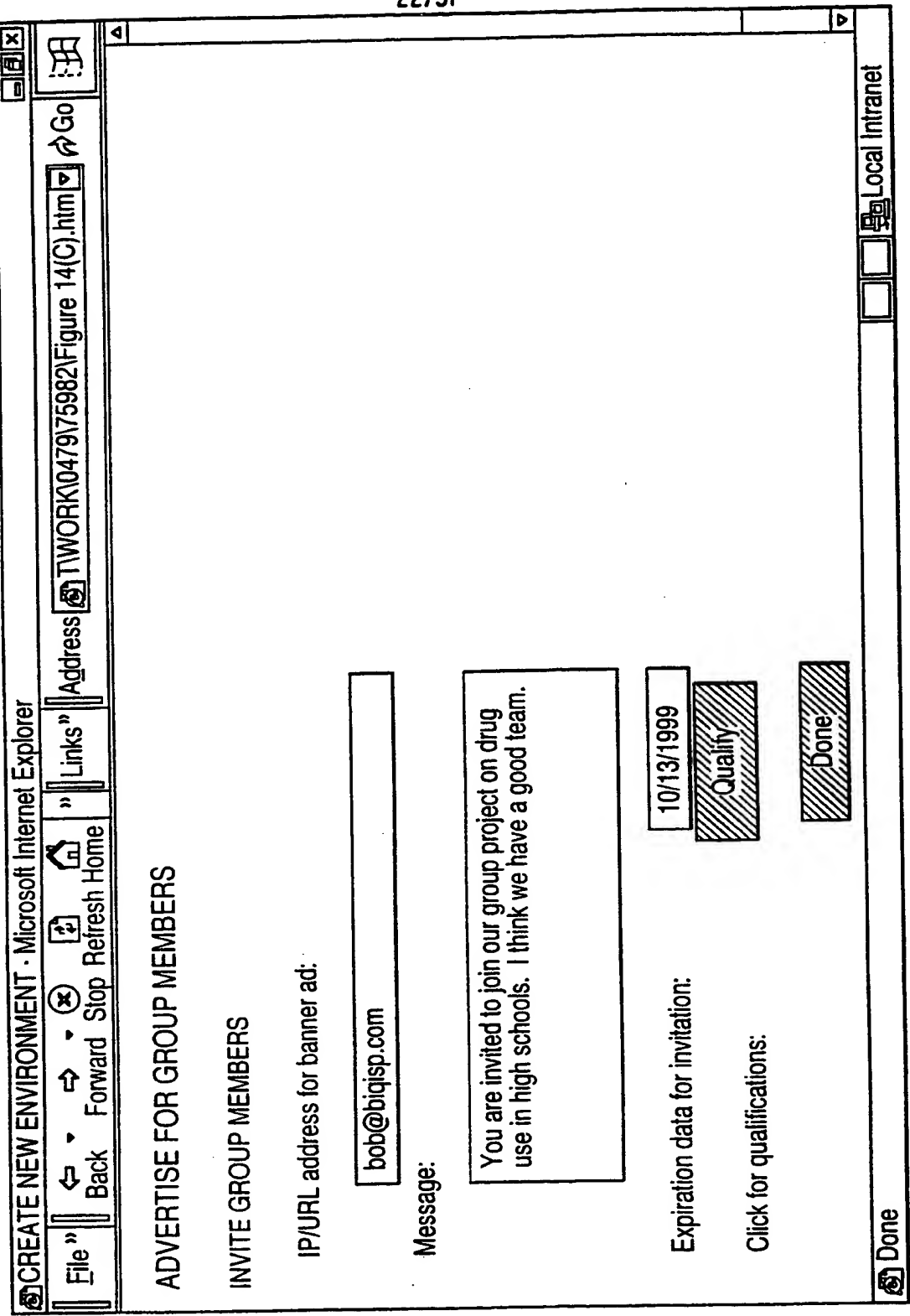
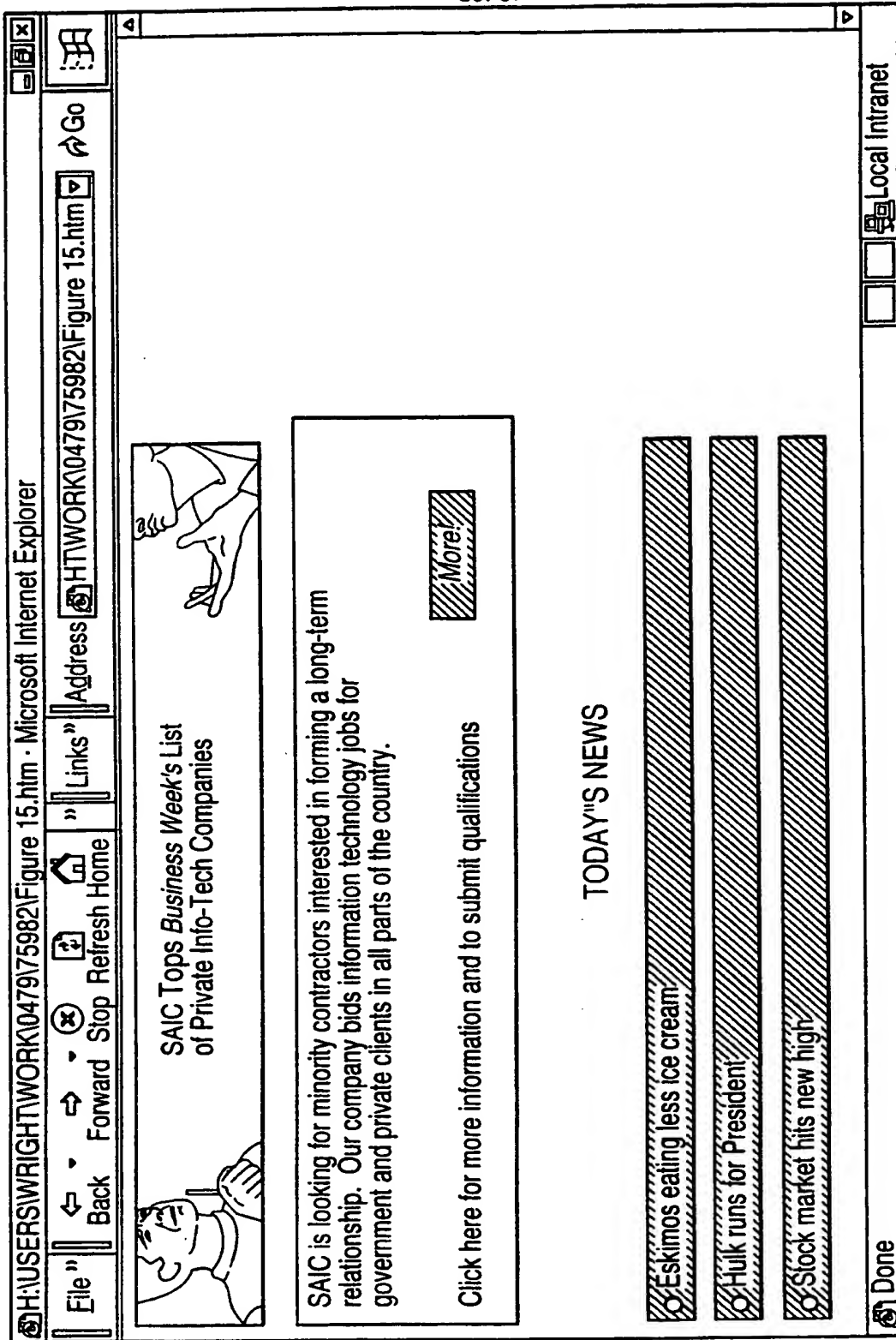


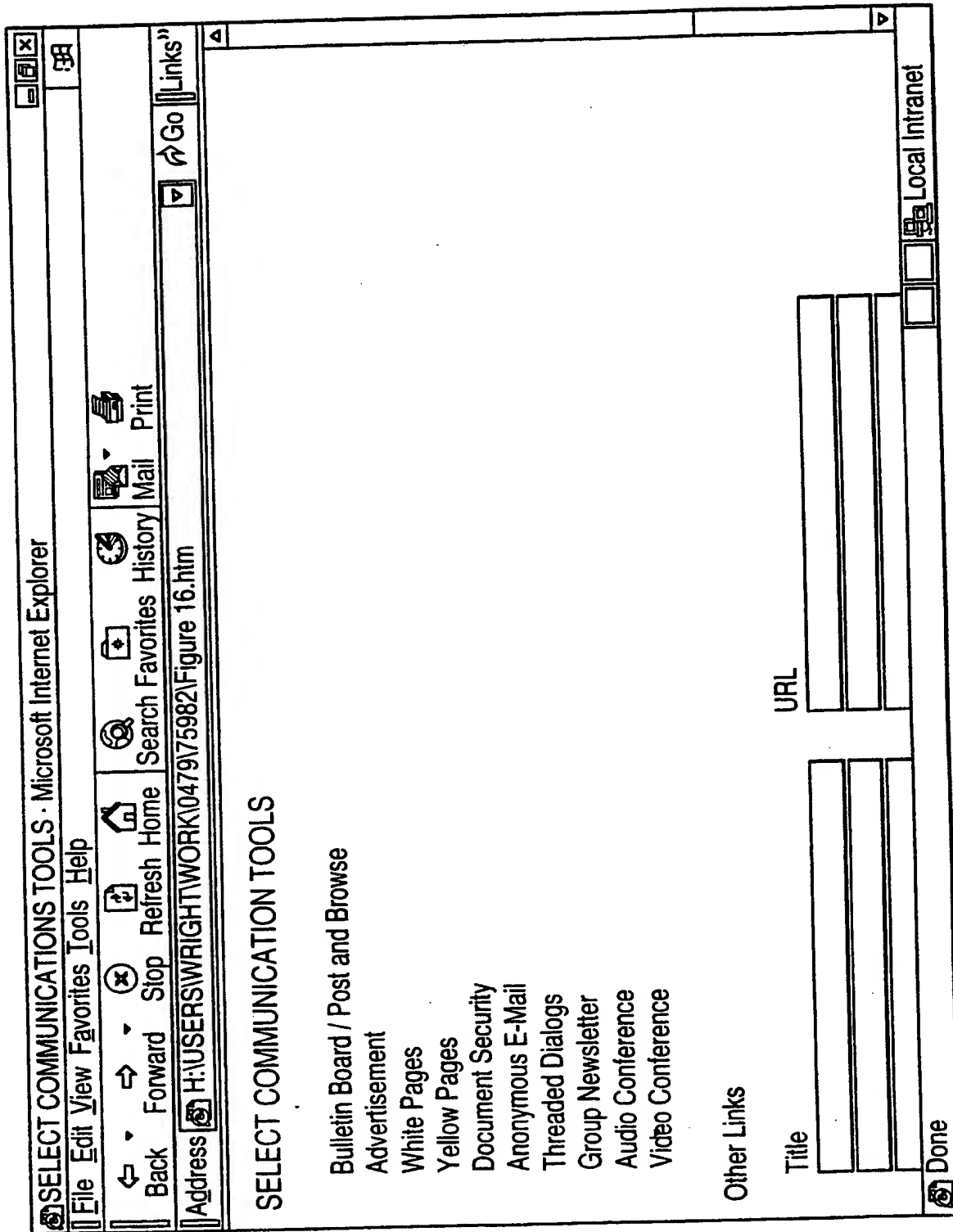
FIG. 14C

FIG. 15



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FIG. 16



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FIG. 17

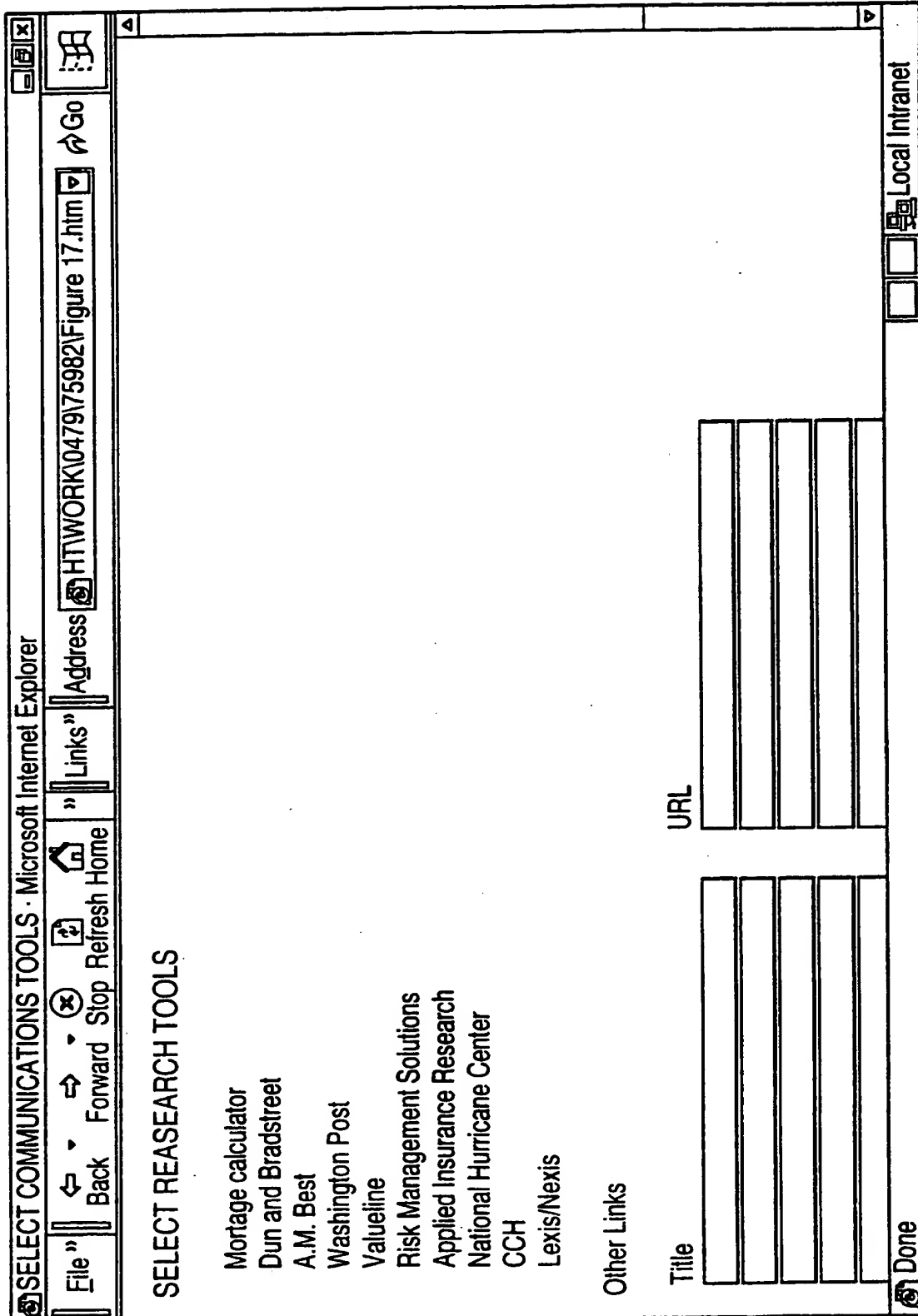
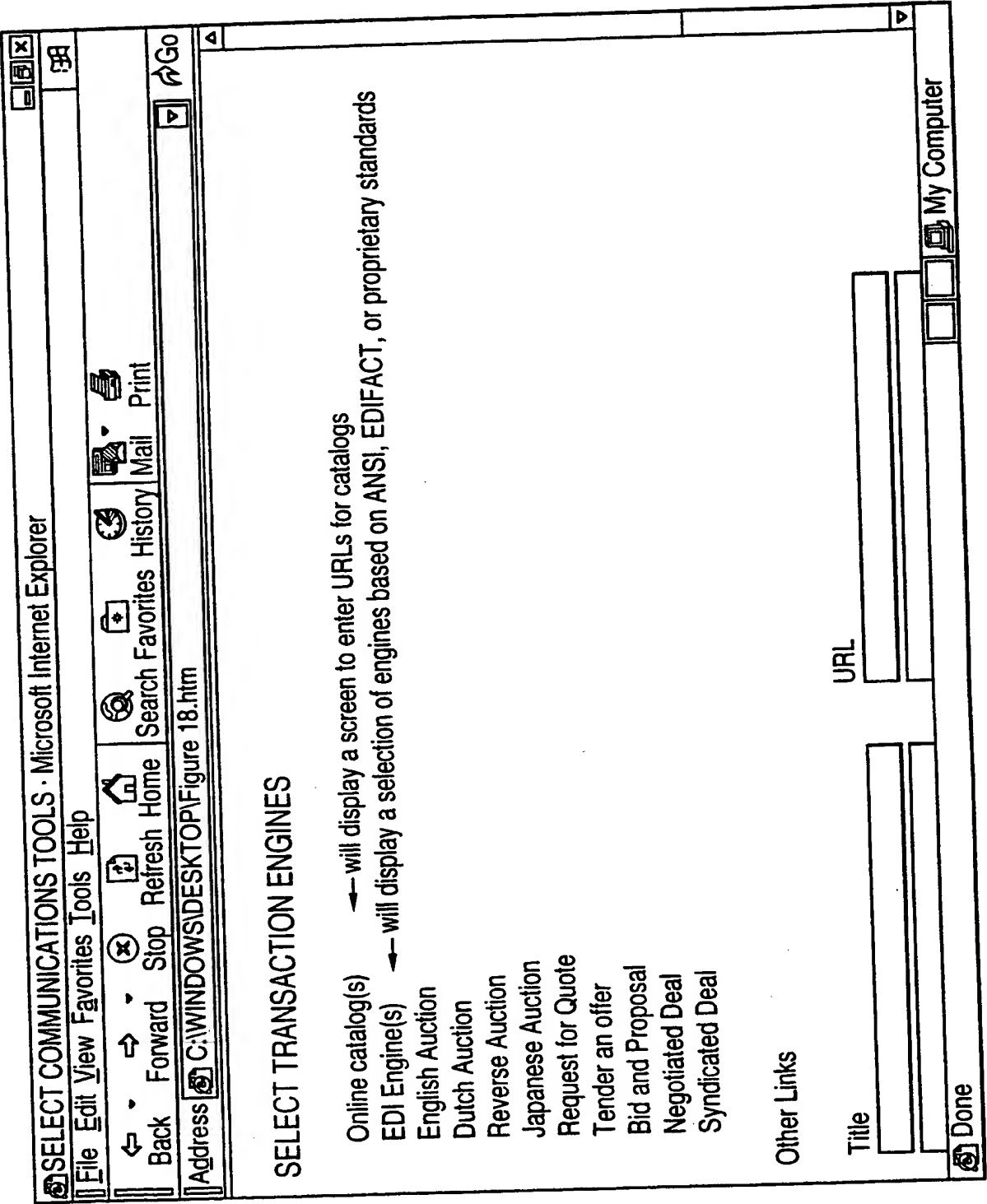


FIG. 18



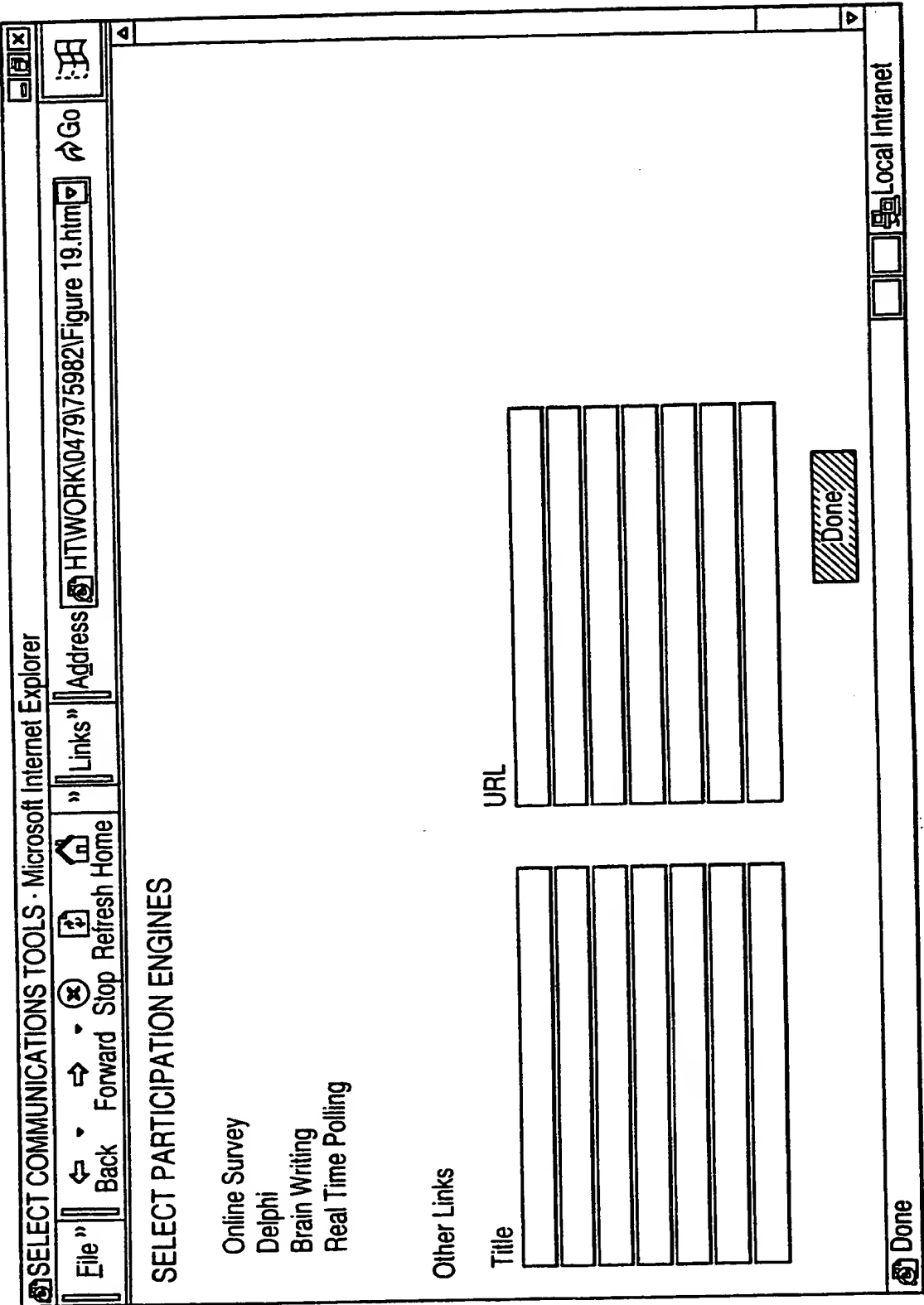


FIG. 19

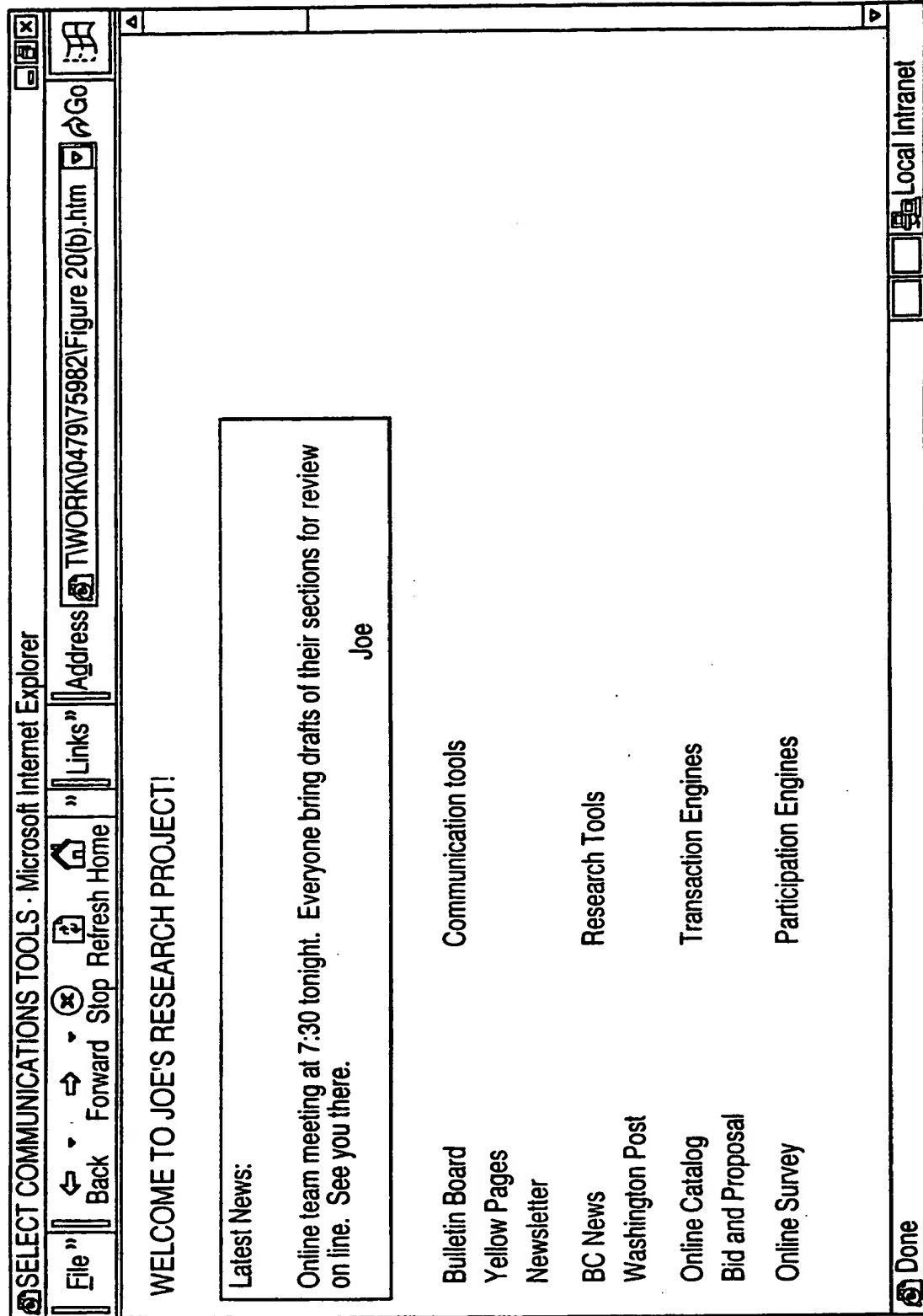
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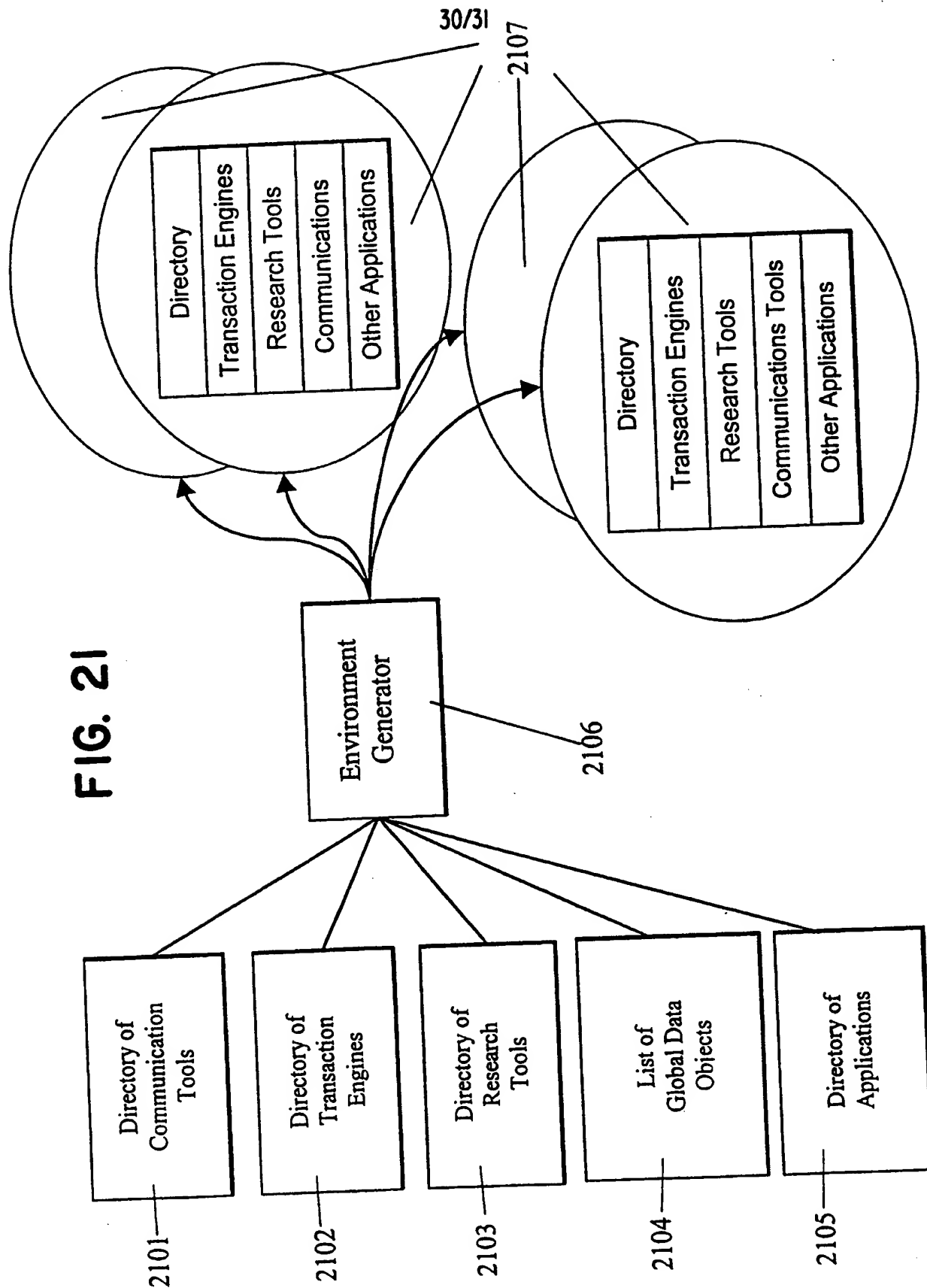
FIG. 20A

The screenshot shows a Microsoft Internet Explorer browser window. The title bar reads "SELECT COMMUNICATIONS TOOLS - Microsoft Internet Explorer". The address bar contains the URL "TWORP\0479\75982\Figure 20(a).htm". The menu bar includes "File", "Edit", "View", "Tools", "Window", and "Help". The toolbar contains buttons for "Back", "Forward", "Stop", "Refresh Home", "Links", and "Go". The main content area displays a login page with the heading "WELCOME TO JOE'S RESEARCH PROJECT!". Below the heading, it says "Please log in:". There are two input fields for "User Name:" and "Password:". Below these fields is a link that says "Send a message to the group". At the bottom right of the page is a "Cancel" button. The status bar at the bottom of the browser window shows "Done" and "Local Intranet".

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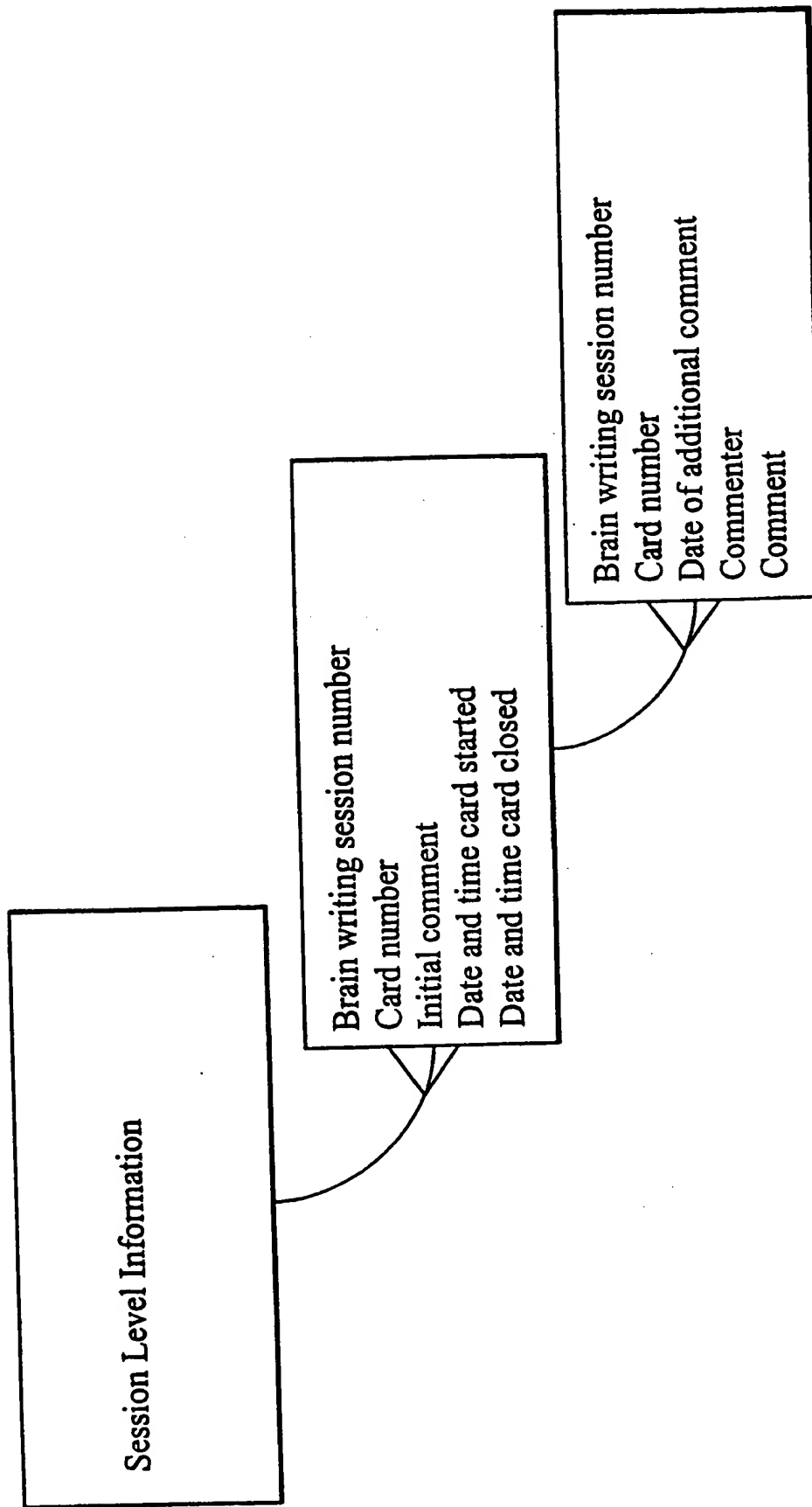
FIG. 20B





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FIG. 22



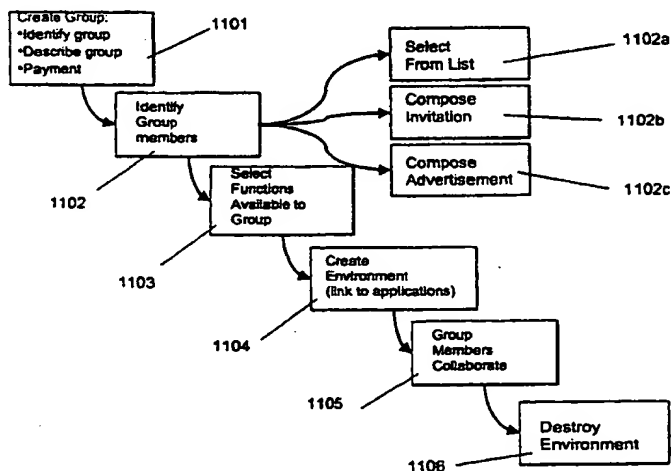
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(21) International Application Number: PCT/US99/21934 (22) International Filing Date: 22 September 1999 (22.09.99) (30) Priority Data: 60/101,431 22 September 1998 (22.09.98) US 09/399,753 21 September 1999 (21.09.99) US (71) Applicant (for all designated States except US): SCIENCE APPLICATIONS INTERNATIONAL CORPORATION [US/US]; 10260 Campus Point Drive, San Diego, CA 92121 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): MILLER, Craig [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). MANGIS, Jeffrey, K. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). LESTER, Harold, D. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). NICHOLAS, John, M. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). WALLO, Andrew [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US).			(US). KRESS, Thomas, P. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). CHEAL, Linda, J. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). WEATHERBEE, James, E., Jr. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). DAVIES, Linda, M. [US/US]; Science Applications International Corporation, 10260 Campus Point Drive, San Diego, CA 92121 (US). (74) Agents: WRIGHT, Bradley et al.; Banner & Witcoff, Ltd., Eleventh floor, 1001 G Street, N.W., Washington, DC 20001-4597 (US). (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. (88) Date of publication of the international search report: 27 July 2000 (27.07.00)

(54) Title: USER-DEFINED DYNAMIC COLLABORATIVE ENVIRONMENTS



(57) Abstract

A collaborative system and method allows members of a group to collaborate on a project such as a bid or proposal. According to a first embodiment, a complex instrument trading engine (CITE) facilitates negotiation between two or more parties. A set of tools and techniques are provided in order to facilitate negotiation and execution of complex instruments such as contracts between corporations and governments. According to a second embodiment, referred to as a dynamic collaborative environment, a user can define a group and a virtual private network environment including user-selected tools that facilitate communication, research, analysis, and electronic transactions within the group. The environment can be destroyed easily when it is no longer needed. Multiple environments can co-exist on the same physical network of computers.

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IPC 7 G06F17/60

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